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## EXPLANATORY NOTES

for

FOREST SERVICE

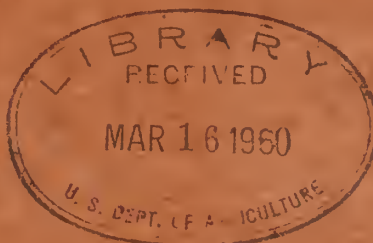
DEPARTMENT OF AGRICULTURE

Fiscal Year

1959

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## PREFACE

The obligations shown in the Project Statements are on the basis of the appropriations and activities proposed in the 1959 Budget Estimates, and in some instances the activities reflected in the Project Statement are further divided into subcategories, reflecting a more detailed description of the work conducted under the appropriation items.

It should be noted that the obligations reflected as subcategories in the Project Statements, while generally obtained from accounting records, in some instances represent the best approximation of the amounts indicated. Wherever it has been necessary, because of the nature of the activity, to distribute certain costs which are not taken directly from the accounts, every effort has been made to allocate such charges as accurately as possible based on past experience, special studies, cost analyses, or other factors.



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## FOREST SERVICE

### Purpose Statement

The Forest Service is responsible for promoting the conservation and wise use of the country's forest and related watershed lands, which comprises one-third of the total land area of the United States. Authority for the work of the Service stems from numerous acts, the more important ones being the Timber Culture Repeal Act of March 3, 1891; Sundry Civil Appropriation Act of June 4, 1897; "Transfer" Act of February 1, 1905; "Weeks" Act of March 1, 1911; Act of June 7, 1924; Forest Research Act of May 22, 1928; and Cooperative Forest Management Act of August 25, 1950.

To meet its responsibility the Forest Service engages in three main lines of work, as follows:

1. Management, protection, and development of the National Forests. The guiding principle is "the greatest good of the greatest number in the long run". This requires obtaining the maximum practicable yield and use of the many resources of the National Forests on a continuing basis, to meet both local and national needs--under normal conditions and during times of stress. The 181,000,000 acres of National Forests are located in 40 States, Alaska, and Puerto Rico. About one-third of the remaining saw timber in the country is in the National Forests.

In managing the National Forests, technical forestry is applied to the growing and harvesting of timber crops. Estimated harvest through timber sales in 1958 is 7.9 billion board feet. Grazing of approximately eight million head of livestock is scientifically managed to obtain range conservation along with the use of the annual growth of forage. Watersheds are managed to regulate stream flow, prevent floods, and provide water for power, irrigation, navigation, and municipalities. Management includes the handling of over 50,000,000 visits of people to the National Forests for recreation purposes. Scientific management is applied to the extensive wildlife resources. Receipts from timber sales, grazing permits, land rentals, and water power permits exceeded \$111,000,000 in 1957.

The protection of the National Forests includes the control of forest fires, which numbered 7,047 in the first eleven months of the calendar year 1957; the control of tree diseases and insect epidemics; and the prevention of trespass.

The major development activities of the National Forests are reforestation, revegetation, construction of roads, recreational facilities, housing, and other necessary improvements and land acquisition and exchanges.

2. Cooperation with State and private forest landowners is provided by the Forest Service to obtain better fire protection on the 435,000,000 acres of State and privately-owned forest lands and to stimulate development and proper management of forest lands.

Under the Soil Bank Conservation Reserve Program the Forest Service is responsible for the technical phases of planting trees on land regularly used for crop production, and for expansion of tree seedling production, primarily through the facilities of State forestry departments.

3. Forest Research. The Forest Service conducts research in the entire field of forestry and the management of forest and related ranges. This includes the growth and harvesting of timber, its protection from fire, insects, and diseases, and the protection and management of watersheds. It conducts studies in forest economics, marketing of forest products, and a survey of the present extent and potential growth and use of the Nation's forest resources. It also conducts research to develop new and improved products from wood and to increase efficiency of utilizing forest products. Results of research are made available to owners of private forest and range lands, to public agencies which administer such lands, to forest products industries, and to consumers.

Related work includes:

4. Insect and disease control. Under the Forest Pest Control Act (16 U.S.C. 594-1-594-5) and the Lea Act (16 U.S.C. 594a), destructive insect pests and diseases that threaten timber areas are suppressed. Activities include two types of work carried on jointly by Federal, State, and private agencies:

a. Surveys on forest lands to detect and appraise infestations of forest insects and infections of tree diseases and determine protective measures to be taken.

b. Control operations to suppress or eradicate forest insect pests and diseases, including the white pine blister rust.

5. Flood Prevention and Watershed Protection. On National Forest lands and on non-Federal forest lands within the watersheds authorized for treatment by the Department of Agriculture under the Flood Control Act of December 22, 1944, the Forest Service plans and installs watershed improvement measures, in the form of minor physical structures, cultural measures, and intensified fire control, to retard runoff and reduce flood water and sediment damage. Work on non-Federal land is carried on in cooperation with the Soil Conservation Service and the appropriate State and local agencies.

The Forest Service also cooperates with the Soil Conservation Service, appropriate State agencies and the local organizations sponsoring small watershed protection and flood prevention projects initiated under the Watershed Protection and Flood Prevention Act of 1954, as amended, in planning and installing forestry and related measures on the watersheds and in inter-agency studies of proposed water and land resource developments on river basins for the purpose of obtaining integrated resource development programs.

6. Land Utilization Projects. Under the authority of Title III of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1011-1012), the Forest Service manages land utilization projects covering areas of submarginal land. The project lands and facilities are made available to States, local organizations, and farmers and ranchers at equitable rates under specific use conditions.

7. Work performed for others. The Forest Service is frequently called upon to perform services for other Federal, State, and private agencies on a reimbursable or advance payment basis. Examples of these activities

- a. Protection of other Federal and non-Federal forest lands intermingled with the National Forests.
- b. Disposal of slash resulting from sales of timber and the rehabilitation of such areas.
- c. Construction and maintenance of roads, and other improvements,
- d. Research investigations in forest, range, and water management and utilization problems.
- e. Cooperative survey, mapping, administrative, and reforestation projects, etc.
- f. Cooperation with defense and mobilization agencies on forest production and utilization projects, and related work.

The Forest Service maintains its central office in Washington with program activities decentralized to 10 Regional offices, 124 Forest Supervisors' offices, 763 District Rangers' offices, 9 Forest and Range Experiment Stations, and the Forest Products Laboratory. On November 30, 1957, the Forest Service had a total of 17,085 employees including 410 full-time employees in the central office and 13,887 full-time and 2,788 part-time employees in the field. The November 30 employment figures for the field are lower than average for the year because of seasonal factors. At the peak of the field season, the number of full-time employees is about 24,000 plus about 10,000 part-time and casual employees.

	Appropriated, <u>1958</u>	Budget Estimates, <u>1959</u>
Appropriated funds:		
National forest and other land management appropriations	a/ \$94,246,000	b/ \$92,516,000
Cooperation with States	13,745,000	12,195,000
Research	<u>11,835,000</u>	<u>12,128,000</u>
Total appropriated funds (excluding permanent appropriations)	<u>119,826,000</u>	<u>116,839,000</u>

a/ Excludes \$643,631 available from prior year balances.

b/ Excludes \$1,050,000 available from prior year balances.





Summary of Appropriations, 1958, and Budget Estimates, 1959

Appropriation Item	: :Appropriated, : 1958	: : Budget : Estimates, : 1959	: Increase (+) : or : Decrease (-)
Forest protection and utilization:			
Forest land management .....	\$68,650,000:	\$68,357,000:	-\$293,000
Forest research .....	11,835,000:	12,128,000:	+293,000
State and private forestry coopera- tion .....	13,245,000:	12,195,000:	-1,050,000
Total, Forest protection and utilization .....	93,730,000:	92,680,000:	-1,050,000
Forest roads and trails .....	a/ 24,336,000:	b/ 23,099,000:	-1,237,000
Acquisition of lands for Cache National Forest .....	c/ 50,000:	50,000:	- -
Acquisition of lands for Superior National Forest .....	d/ 500,000:	e/ 300,000:	-200,000
Acquisition of lands for national forests, Special Acts .....	10,000:	10,000:	- -
Cooperative range improvements .....	f/ 700,000:	700,000:	- -
Assistance to States for tree planting Expenses, brush disposal (permanent) ..	500,000: 4,500,000:	- - 4,500,000:	-500,000 - -
Roads and trails for States (permanent)	g/ 10,788,500:	10,788,500:	- -
Forest fire prevention (permanent) ....	h/ 15,000:	15,000:	- -
Payment to Minnesota from the national forests fund (permanent) .....	48,000:	48,000:	- -
Payments due counties, submarginal land (permanent) .....	425,000:	425,000:	- -
Payments to school funds, Arizona and New Mexico (permanent) .....	129,400:	129,400:	- -
Payments to States and Territories from the national forests fund (permanent) .....	26,969,200:	26,969,200:	- -
Total .....	162,701,100:	159,714,100:	-2,987,000
Deduct permanent appropriations (shown in detail above) .....	-42,875,100:	-42,875,100:	- -
Total (excluding permanent appropriations) .....	119,826,000:	116,839,000:	-2,987,000

a/ In addition, \$336,496 available from prior year balances.

b/ In addition, \$850,000 is estimated to be available from prior year balances.

c/ In addition, \$3,416 available from prior year balances.

d/ In addition, \$268,090 available from prior year balances.

e/ In addition, \$200,000 is estimated to be available from prior year balances.

f/ In addition, \$35,629 available from prior year balances.

g/ In addition, \$489,368 available from prior year balances.

h/ In addition, \$4,825 available from prior year balances.

Transfer in the 1959 Estimates

The 1959 Budget proposes a transfer in the estimates of \$100,000 to the Department of the Interior, Bureau of Land Management, from the appropriation "Forest Protection and Utilization," subappropriation "Forest Land Management."

This transfer involves the protection and management of 2,174,856 acres of Title III Bankhead-Jones lands in Montana and New Mexico, which lands are proposed for transfer to the Department of the Interior for administration by the Bureau of Land Management. The lands proposed for transfer are largely intermingled with or adjacent to lands already administered by the Department of the Interior. The purpose of the proposed action is to eliminate duplication in the administration of these intermingled lands. Transfer of administration from the Department of Agriculture to the Department of the Interior will be effective upon signature by the President of a pending Executive Order.

(a) Forest Protection and Utilization

	<u>Forest Land Management</u>	<u>Forest Research</u>	<u>State and Private Forestry Cooperation</u>	<u>Total</u>
Appropriation Act, 1958 a/\$69,450,000		\$11,835,000	\$13,245,000	a/\$94,530,000
Less savings in 1958 reflected as reductions in 1959 estimates .....	-1,225,600	-100,000	-50,000	-1,375,000
Activities transferred in the 1959 Estimates to "Department of the Interior, Bureau of Land Management" ....	-100,000	- -	- -	-100,000
Base for 1959 .....	a/68,125,000	11,735,000	13,195,000	a/93,055,000
Budget Estimate, 1959 .....	a/69,057,000	12,128,000	12,195,000	a/93,380,000
Net change, 1959 .....	<u>+932,000</u>	<u>+393,000</u>	<u>-1,000,000</u>	<u>+325,000</u>

a/ Includes \$700,000 by transfer from "Cooperative Range Improvements."

SUMMARY OF INCREASES AND DECREASES, 1959

Forest Land Management:

Decrease due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation .....	- \$68,000
To provide housing for employees and other structural improvements on national forests .....	+1,000,000
Subtotal .....	<u>+932,000</u>

Forest Research:

Decrease due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation .....	-7,000
For research in forest products utilization .....	+400,000
Subtotal .....	<u>+393,000</u>

State and Private Forestry Cooperation:

Decrease in the Federal share of costs of producing trees for reforestation of State and private lands .....	<u>-1,000,000</u>
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PROJECT STATEMENT

Project	1957	1958 (estimated)	Increase or Decrease	1959 (estimated)
1. Forest Land Management:				
a. National forest protection and management:				
(1) Timber resource management:				
(a) Sales administration and management .....	\$9,674,945:	\$12,505,000:	- -	\$12,505,000
(b) Reforestation and stand improvement .....	1,460,018:	2,185,000:	- -	2,185,000
(2) Recreation-public use	3,516,357:	8,020,000:	- -	8,020,000
(3) Wildlife habitat management .....	378,735:	510,000:	- -	510,000
(4) Range resource management:				
(a) Management .....	1,346,562:	1,570,000:	- -	1,570,000
(b) Revegetation .....	860,180:	1,190,000:	- -	1,190,000
(c) Improvements .....	1,264,999:	1,300,000:	- -	1,300,000
(5) Soil and water management .....	595,100:	810,000:	- -	810,000
(6) Mineral claims, leases and other land uses ....	2,115,054:	3,180,000:	- -	3,180,000
(7) Ranger district management .....	6,866,671:	7,050,000:	-\$68,000(1):	6,982,000
(8) Land utilization projects .....	833,858:	1,090,000:	- -	1,090,000
(9) Forest fire protection:	10,246,695:	11,300,000:	- -	11,300,000
(10) Structural improvements for fire and general purposes (construction and maintenance) .....	4,779,879:	7,110,000:	+1,000,000(2):	8,110,000
Subtotal, National forest protection and management:	43,939,053:a/	57,820,000:	+932,000	58,752,000
b. Fighting forest fires	11,577,593:	5,000,000:	- -	5,000,000
c. Insect and disease control:				
(1) White pine blister rust control .....	2,627,869:b/	2,780,000:	- -	b/ 2,780,000
(2) Other pest control ..	3,038,731:	2,425,000:	- -	2,425,000
Subtotal, Insect and disease control .....	5,666,600:	5,205,000:	- -	5,205,000
d. Acquisition of lands (Weeks Act) .....	99,354:	100,000:	- -	100,000
Total, Forest Land Management .....	61,282,600:a/	68,125,000:	+932,000	69,057,000
2. Forest Research:				
a. Forest and range management research .....	5,032,961:	5,580,000:	-7,000(3):	5,573,000
b. Forest protection research:				
(1) Forest fire research	320,158:	641,500:	- -	641,500
(2) Forest insect research:	769,623:	805,900:	- -	805,900

(Continued on next page)



Project	1957	1958 (estimated)	Increase or Decrease	1959 (estimated)
2. <u>Forest Research - Cont.</u>				
(3) <u>Forest disease</u>				
research .....	612,592:	692,600:	- -	692,600
Subtotal, Forest protec-				
tion research .....	1,702,373:	2,140,000:	- -	2,140,000
c. <u>Forest products utiliza-</u>				
<u>tion research</u> .....	1,927,133:	2,215,000:	+400,000(4):	2,615,000
d. <u>Forest resources</u>				
<u>research:</u>				
(1) <u>Forest survey</u> .....	1,042,900:	1,406,300:	- -	1,406,300
(2) <u>Economic research</u> ...	356,666:	393,700:	- -	393,700
Subtotal, Forest resources:				
research .....	1,399,566:	1,800,000:	- -	1,800,000
Total, Forest Research ....	10,062,033:	11,735,000:	+393,000	12,128,000
3. <u>State and Private</u>				
<u>Forestry Cooperation:</u>				
a. <u>Cooperation in forest</u>				
<u>fire control</u> .....	10,021,340:	10,043,000:	- -	10,043,000
b. <u>Cooperation in forest</u>				
<u>tree planting</u> .....	1,001,443:	1,258,000:	-1,000,000(5):	258,000
c. <u>Cooperation in forest</u>				
<u>management and processing</u> :	994,459:	1,510,000:	- -	1,510,000
d. <u>General forestry</u>				
<u>assistance</u> .....	156,817:	384,000:	- -	384,000
Total, State and Private				
Forestry Cooperation .....	12,174,059:	13,195,000:	-1,000,000	12,195,000
Total, Forest Protection and:				
Utilization, Forest Service:	83,518,692:a/	93,055,000:	+325,000	93,380,000
Unobligated balance no				
longer available .....	549,185:	- -	- -	- -
Unobligated balance carried				
forward .....	35,629:	- -	- -	- -
Total available or estimate	84,103,506:a/	93,055,000:	+325,000	93,380,000
Transfer from "Cooperative				
Range Improvements"				
(comparative in 1957) ....	-742,756:	-700,000:	- -	-700,000
Transfer in 1958 Estimates				
from:				
"Salaries and expenses,				
Forest Service" .....	-71,170,750:	- -	- -	- -
"Acquisition of lands for				
national forests, Weeks				
Act" .....	-100,000:	- -	- -	- -
"State and private				
forestry cooperation" ..	-12,190,000:	- -	- -	- -
Comparative transfer in 1959:				
Estimates to "Department of:				
the Interior, Bureau of				
Land Management" .....	100,000:	100,000:	-100,000	- -
Savings in 1958 reflected as:				
reduction in 1959 Estimates:	- -	1,375,000:	-1,375,000	- -
Total appropriation or				
estimate .....	- -	a/ 93,830,000:	-1,150,000	92,680,000

a/ Excludes \$35,629 of prior year balances available under a no-year fund, "Cooperative Range Improvements."

b/ Includes \$355,900 to be allocated to Department of the Interior.

## INCREASES AND DECREASES

The net increase of \$932,000 for the subappropriation "Forest Land Management" consists of:

(1) A decrease of \$68,000 due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation.

(2) An increase of \$1,000,000 for construction of employee housing and other structural improvements on national forests.

Need for Increase: Forest Service programs have been substantially expanded in recent years to meet current demands for increased service and resource products. Timber management and recreation have received the greater increases, but significant increases have been received for reforestation, revegetation, land use, range resource management, soil and water management, and other activities.

The direct result of this expanded activity is to increase requirements for structural facilities and the need for modernization of structures previously constructed.

One of the most urgent needs is for housing of employees. The substantial expansion of Forest Service programs in recent years requires locating employees in remote areas and small communities where suitable rental buildings are, in most cases, non-existent. At present, many of these employees are living in substandard "shacks", tents, or trailer houses. Some have their families living in distant towns which are too far away for daily commuting.

Adequate housing is a "must" for recruitment and retention of competent personnel. It represents an employee relations problem which has to be recognized and solved by management--in this case the Federal Government. As a matter of comparability with private industry, which in general is able and willing to offer desirable housing, the Federal Government should be on a reasonably equal footing to recruit and hold its professional foresters. The need for housing also is increased by the necessity of having the men readily available on short notice for forest fire control work. Prompt attack by day or night, any day of the week, is a primary requisite for the fire control organization of which these men are an integral part. This fact is further justification for providing dwellings for employees at many stations.

In addition, many structural improvements for fire protection are inadequate to meet present-day risks and hazards with the high values being protected. Some fire lookout towers have deteriorated to the point where a decision must be made as to whether to gamble on the risk of fire occurrence or the safety of the men who must be stationed at those locations.

Most of the work needed to successfully carry out the expanded Forest Service programs is of necessity administered from central ranger station headquarters. Administrative structural facilities, such as office buildings, storage buildings, bunk houses for seasonal workers, etc., are in many locations either lacking, inadequate, or have reached a stage of obsolescence and should be replaced, in the interests of long range economy.



Funds for improvement construction must keep in balance with funds for operating programs for effective progress. Increases provided during the past two years have been very helpful in relieving the situation in many acute areas. There is need, however, to increase the annual level of financing to provide an orderly program which can reasonably be accomplished during the next several years.

Plan of Work: The \$1,000,000 increase requested, plus currently available funds, would provide a total of about \$5,000,000 for new construction to meet highest priority needs in 1959.

The proposed increase will be allotted to field units on the basis of need with housing for personnel as the first priority. It is estimated that from 45 to 50 additional dwellings and dormitories will be built, depending upon cost factors in 1959. Bureau of the Budget regulations and standards for Federal housing will be followed for all projects. Quarters rentals of about \$26,000 annually will be deducted from the salaries of employees occupying these housing units. A portion of the increase will be used for other facilitating structures needed for the protection and management of the national forests. These would include offices, work centers, lookouts, telephone lines, etc.

(3) A decrease of \$7,000 due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation.

(4) An increase of \$400,000 for research in forest products utilization.

Need for Increase: The development of profitable uses for cull and low-grade timber, little-used species, and small thinnings, particularly in eastern and southern hardwoods, is one of the most important problems of forestry in this country. This problem is of major significance on the 60 percent of commercial forest lands which are in farm and other small holdings. The quality of the timber on those lands has deteriorated, through high-grading of the better timber, to a point where much of the stand is unsalable.

For the country as a whole, approximately one-eighth of the volume of all timber cut is left in the woods. These logging residues increase fire and insect hazard and interfere with the establishment of new tree growth. The unused wood is especially troublesome in virgin forests where there is a high percentage of defective timber. Of the timber brought to sawmill and other manufacturing plants, an additional one-eighth is left as residues. Therefore, 25 percent of timber cut is not utilized. Utilization of these presently unused materials will not only lessen woods and mill problems but will extend our timber supply as well.

Crooked, defective, little-used, and cull trees occupy good growing space in the woods. These undesirable trees encumber growth of the more valuable ones. Again, the answer is to find profitable uses for this raw material in order to make way for better growth.

These overall problems can be solved by research on several major phases of wood utilization as follows:

(a) Pulp and paper. The development of the semichemical and cold soda processes for use of hardwoods for pulp and pulp products has broadened the raw material base for this industry. These

processes should be improved and refined in order to reduce cost and improve quality of product. Untried species should be tested. These new pulps should be tested alone and in combination with other pulps and fibers for possible development of new products.

- (b) Chemical derivatives. Woods and mill residues, and defective and crooked trees not suitable for pulp or other products afford a large potential volume of raw material for chemical processing to useful industrial chemicals, bases for plastics and adhesives. As an example, levulinic acid, one product of the action of dilute acid and heat on wood, is reported to have high potential for the improvement of the quality of some commonly used plastics, as well as for other uses. This chemical is one of the products which may be derived from a multi-product process now under study. There is evidence also that many useful products may be made from lignin, a residue from pulp manufacture and other chemical processing.
- (c) Seasoning. One reason why many refractory hardwoods are unused is the difficulty of seasoning. There is need to develop low cost methods which will result in a minimum of deterioration of the wood.
- (d) Fabrication. There are great opportunities to expand the use of many little-used woods by their manufacture into composite products such as plastic and paper overlays, glued-up products, building units, and industrial parts. The development and testing of adequate adhesives, of satisfactory fabrication methods, and for determining formulas for design are needed.
- (e) Improved log and tree grades. There is need to develop an adequate system of log and tree grades in order to direct timber into its highest uses, to facilitate marketing, and to appraise value of timber for specific uses. Present grades for many species are inadequate.

Plan of Work: Much of the above work requires laboratory facilities available at the Forest Products Laboratory, Madison, Wisconsin. However, the field testing of products, preseasoning experiments, and the development of adequate log and tree grading methods are examples of research that will be carried on at appropriate field locations. In the first year, 1959, the increase would be used for replacement of the present inadequate and hazardous boiler plant of the Forest Products Laboratory at Madison, Wisconsin, as explained in detail under changes in General Provisions language. In subsequent years, the entire amount would be used on the research projects indicated above.

(5) A decrease of \$1,000,000 in the activity "Cooperation in forest tree planting" under the subappropriation "State and Private Forestry Cooperation."

This program was undertaken in 1924 for the purpose of encouraging the planting of trees on inadequately stocked State and private forest lands. As the program has developed over the years, the financial responsibility assumed by the States and private owners has increased to the point where the non-Federal cost share is now about 80%. While a smaller Federal contribution is proposed to provide leadership and incentive, it is believed the program should be continued at or near current levels with increased contributions from States and private landowners.

EXPLANATION OF CHANGE IN LANGUAGE

The estimates include a proposed change in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

For expenses necessary for forest protection and utilization,  
as follows:

Forest land management: For necessary expenses of the Forest  
Service \* \* \*

State and private forestry cooperation: For cooperation with  
States in forest-fire prevention and suppression, in forest  
tree planting on non-Federal public and private lands, and in  
forest management and processing, and for advising timberland  
owners, associations, wood-using industries, and others in the  
application of forest management principles and processing of  
forest products, as authorized by law; [\$13,245,000]  
\$12,195,000.

[Forest Land Management:] During the current fiscal year not  
to exceed \$50,000 of the funds appropriated under this heading  
shall be available for the acquisition of sites authorized by  
the Act of March 3, 1925, as amended (16 U.S.C. 555), without  
regard to any other limitation on the amount available for this  
purpose.

This language change is proposed to delete the subappropriation title  
"Forest Land Management" in order to make the provision included in the  
Supplemental Appropriation Act, 1958, for the acquisition of administra-  
tive sites applicable to the entire appropriation for "Forest Protection  
and Utilization".





STATUS OF PROGRAM

FOREST LAND MANAGEMENT

National Forest Protection and Management

**Current Activities:** The purpose of this program is to manage, protect, and develop the national forests and insure that timber, water, range, recreation, wildlife, and other resources are utilized in a manner so as to best serve the Nation.

National forests are managed under the multiple-use principle with practically all areas used for, or serving, more than one purpose or objective. For example, 50 percent of the area within the national forests of the continental United States serves five different purposes: (1) timber production, (2) watershed protection, (3) forage production, (4) wildlife production, and (5) recreation. An additional 28 percent serves four purposes in varying combinations. Of the remainder, 21 percent of the total serves three purposes with only one percent of the total reserved for one purpose exclusively, mainly campgrounds and special use areas, such as summer home sites, pastures, corrals, etc.

The varied interests which inevitably conflict and which must be reconciled, the vast areas covered, and the unusual complexities, clearly require careful planning and skillful management of the national forest properties.

The protection of national forests from fire and trespass is made difficult by the large area to be protected, the general inaccessibility, the many thousands of miles of exterior boundary, and the impossibility of taking preventive action with such a problem as lightning-caused fires.

National forest boundaries encompass an aggregate area of 225,000,000 acres in 40 States, Alaska, and Puerto Rico, of which some 181 million acres are under Forest Service administration. Many tracts of privately owned lands are interspersed within the Federal holdings.

The economic importance of the national forests will be realized when it is considered that:

- a. The national forests produced a cash income in the fiscal year 1957 of about \$111,000,000. Approximately 65 percent of this amount is credited to the general fund in the Federal Treasury (miscellaneous receipts). The remainder is distributed in accordance with special acts of Congress, including 25 percent to the States and counties in which lands are located. In addition to cash receipts, the non-monetary values of water, recreation, and wildlife on the national forests are estimated to exceed \$300,000,000 annually. Water values

accounted for the major portion of this amount, based upon a conservative valuation per acre-foot of water which flowed from the national forests, that was used for irrigation, power, municipal water supplies, and industrial use.

- b. The area within national forest boundaries is equivalent to some ten percent of the area of the continental United States.
- c. The national forests supplied 7.0 billion board feet in fiscal year 1957 to the nation's forest products industries. Dependence of the forest products industries on national forest timber continues to increase as the result of depletion of good quality timber on private lands.
- d. About 8,000,000 head of domestic livestock (including calves and lambs) are grazed on national forest lands.
- e. The national forests provide protection to municipal water supplies for nearly all western cities and towns and many in the East, to irrigation water used on about 20,000,000 acres of western lands, and to many streams with water power developments. They provide flood protection to thousands of acres of rich valley lands and help to prevent more rapid siltation of reservoirs and stream channels.
- f. They provide a habitat for a large part of the big game animal population, for birds, and for millions of small game animals and furbearers.
- g. They provide opportunities for healthful outdoor recreation, with a minimum of restrictions, for the millions of people who yearly visit the national forests.
- h. Nearly 4,000,000 people who live in and near the national forests are supported in whole or in part through the economic development arising through management and utilization of the forests and their resources.

In addition, about 7,000,000 acres of land utilization projects in 30 States are managed under this appropriation item. Revegetation and other development work has been done on submarginal land projects in cooperation with local and State agencies. Developed lands are made available to local farmers and ranchers at equitable rates under specific use conditions. Of the revenue amounting to about \$1.7 million in fiscal year 1957 relating to these projects, 75 percent goes to the Treasury and 25 percent to the counties in which the lands are located.

The Forest Service, as a part of its regular programs, also directs Federal activities and provides technical guidance to States concerned with the prevention and control of fires which might be caused by an enemy attack in rural areas of the United States.



Selected Examples of Recent Progress:

Receipts:

The following table summarizes cash receipts for fiscal years 1956 and 1957:

<u>National Forests</u>	<u>1956</u>	<u>1957</u>	<u>Change, 1957 compared with 1956</u>
Timber .....	\$110,127,124	\$106,872,791	-\$3,254,333
Grazing .....	2,906,282	2,682,349	-223,933
Land Use, Power, etc. ....	<u>1,759,693</u>	<u>2,033,454</u>	<u>+273,761</u>
Subtotal .....	114,793,099	111,588,594	-3,204,505
Land Utilization Projects...	<u>2,204,059</u>	<u>1,734,666</u>	<u>-469,393</u>
Total Receipts .....	116,997,158	113,323,260	-3,673,898

Above amounts include:

Suspense account, Alaska <u>1/</u>	(568,184)	(531,930)	(-36,254)
Suspense account, O&C			
Lands <u>2/</u> .....	(2,485,782)	(3,561,732)	(+1,075,950)

1/ Suspense account established pending settlement of Indian rights on Tongass Forest, Alaska.

2/ Special account established for certain lands in Oregon.

In addition to the above receipts it is estimated that the Bureau of Land Management collected about \$1,250,000 of receipts from mineral leases on national forest land.

Net area of lands under Forest Service administration changed from 181,081,539 acres as of June 30, 1956, to 181,068,121 acres on June 30, 1957. This is exclusive of about 7 million acres of land administered under Title III of the Bankhead-Jones Farm Tenant Act.

Timber Sales Administration and Management

Volume and value of national forest timber cut in fiscal year 1957 again reached new "highs" despite a downward trend in total production for the Nation. This is the fifth consecutive year of new highs for volume. For four of the past five years new highs in value were also reached, with 1954 being slightly less than the previous year. Lumber and plywood production and markets were on a "down" trend during the year.

Receipts were slightly lower in 1957 than the value of timber cut, due to (a) a trend toward a smaller margin in cash deposits in advance of cut, and (b) furnishing of a bond in lieu of a cash advance by some operators, which was a newly instituted procedure in 1957.

The trend of volume, stumpage value, and receipts of national forest timber cut over the years is shown in the following table:

<u>Fiscal Year</u>	<u>Volume Cut</u>	<u>Stumpage Value</u>	<u>Receipts</u>
	Million <u>Board Feet</u>	Average per Thousand <u>Board Feet</u>	
1910	380	\$2.39	\$1,011,217
1920	805	2.20	2,044,600
1930	1,653	2.91	4,389,893
1940	1,740	2.76	3,943,022
1950	3,502	8.77	30,269,202
1957	6,974	16.57	106,872,791

Preliminary award has been made for 6,000,000 cords of national forest timber in Arizona and New Mexico. This is the first sale of pulpwood in these States, other than incidental amounts in sawtimber sales. Construction of a pulpmill by the purchaser is contemplated in connection with this sale.

Reforestation and Timber Stand Improvement Accomplishment - Fiscal Year 1957

	<u>Treated Acreage (by fund sources)</u>		
	<u>Forest Land Management (appropriation)</u>	<u>Sale Area Betterment (collections)</u> <u>1/</u>	<u>Total</u>
Planted and seeded .....	24,013	68,626	92,639
Site preparation work (scarifying, etc.) .....	48,210	40,283	88,493
Plantation release, and weeding and thinning of natural stands .....	32,751	375,514	408,265
Pruning of crop trees .....	8,698	134,491	143,189
Animal control to protect new trees (fence con- struction, etc.) .....	69,967	105,445	175,412
Rodent control .....	38,763	47,607	86,370
Disease control incidental to reproduction (except blister rust control) ...	26,782	17,030	43,812

1/ These are funds collected from timber sale operators for betterment of the sale area as authorized under Section 3 of the Act of June 9, 1930 (16 U.S.C. 576b).



### Recreation-Public Use

In 1956 recreation use again increased sharply when 52.5 million visitors came to the national forests for recreation. This 14.9% increase over 1955 was substantially higher than had been estimated. The trend of greater use each year of national-forest recreation areas shows no sign of weakening.

The more than 470 resorts, 120 winter sports areas, and 16,600 summer homes under special use permit supplement free public areas and are a very important part of national-forest recreation.

Increased funds appropriated in fiscal year 1957 for sanitation and care of public camp and picnic areas made it possible to do a complete job of cleanup, policing, and current maintenance at the 4,700 improved recreation areas. Cleanliness and sanitary conditions were better than for many years, but the overcrowded and overused condition was not improved. Progress was made in rehabilitating existing deteriorated facilities and a start was made in providing a few new areas. Emphasis in rehabilitation was put on sanitation and traffic control facilities. New construction was limited to urgently needed areas.

Preparations were made for the "Operation Outdoors" program starting in fiscal year 1958. Key personnel including landscape architects and recreation planners have been recruited and trained. Development of detailed site plans for recreation areas has been expedited. Plans are needed for both old areas to be rehabilitated and new areas to be developed. Inspection and supervision are being stepped up to insure that high standards of construction and maintenance are followed.

### Wildlife Habitat Management

Over 25 percent of the 52.5 million recreational visits to the national forests in 1956 were primarily to fish and hunt. Equally important to most of the other visitors was the opportunity to see and study wildlife in natural surroundings. The growing importance of Forest Service work in the protection and development of wildlife habitat is shown by the following estimates:

	<u>1950</u>	<u>1956</u>	<u>Change</u>
Hunter visits	\$2,285,000	\$4,436,000	+94%
Fisherman visits	<u>4,885,000</u>	<u>9,499,000</u>	<u>+94%</u>
Total hunter and fisherman visits	7,170,000	13,935,000	+94%
Big game numbers	2,620,000	3,410,000	+26%
Big game harvest	356,000	518,000	+45%

Within the national forests there are 81,000 miles of fishing streams and more than 2-1/4 million acres of fishing lakes. These include much of the Nation's best trout waters. Furbearers, such as beaver, marten, mink, and muskrat, are often common. Small game, including grouse, squirrels, and rabbits, are found in nearly all the forest areas. Such prized species as the turkey occur and are hunted on many forests. The national forests provide food, shelter, and water for:

One-third of the Nation's big game animals

Over four-fifths of the Nation's elk, mountain goats, moose, and grizzly bears

Nearly two-thirds of the Nation's mule deer and black bear.

The primary wildlife management job of the Forest Service is to maintain and develop a productive habitat. This is accomplished in two ways: (1) through coordination and adjustment of other resource management activities; and (2) through direct habitat improvement projects usually in cooperation with State Game Departments.

Coordination of Wildlife Needs with Other Resource Management--A comprehensive checklist of nearly 100 measures that will help integrate wildlife needs with other resource management programs was prepared and made available to all forest officers. Limited wildlife management plans that provide for the coordination of wildlife work with other forest management activities have been completed for about 60 percent of all forests. The Forest Service through its timber management program is engaged in the most important habitat management job of any agency in the world. Commercial timber sales, plantations, and timber stand improvement work involving over 2 million acres annually provide a practical, low-cost way to improve habitat for big game and upland game birds. There is still need, however, for increased technical leadership and guidance at the field level in the development of comprehensive management plans; in the training of field men in wildlife work; and in administrative study and research to guide habitat improvement into the most productive channels.

Cooperation with States in Wildlife Management--Cooperative wildlife work with the States was continued and strengthened. Several State-wide cooperative agreements were revised and a new cooperative agreement was entered into with the Arkansas Game and Fish Commission. Several new fishing lakes were constructed or are now under construction by the various States under the terms of these agreements. Big game range improvement projects involving brush manipulation, browse revegetation, and the creation of openings in dense forests were completed or started on many thousand acres of national forest land in cooperation with the States. Shrubs and trees were planted and water developments constructed to provide better food, cover, and water conditions for wildlife.



Mutual problems in the field of wildlife management were discussed at a significant meeting between the Forest Service and the Executive Committee of the International Association of Game, Fish and Conservation Commissioners held in Washington on December 3-4, 1956. Basic State-Forest Service wildlife management responsibilities and policies were reviewed. A policy statement on the division of State and Federal responsibilities for direct habitat development work on the national forests was approved by the States and the Department. In brief, this policy provides that the Forest Service should take the leadership in the development and management of improvements that involve vegetation and the States should finance structural improvements such as dams.

#### Range Resource Management

In calendar year 1956 livestock owned by 24,424 grazing permittees were permitted to graze on the national forests in the following numbers:

1,134,948 cattle and horses for 5,746,812 animal months

2,738,711 sheep and goats for 7,734,986 animal months

The average prices per hundred pounds paid to producers in the western States for beef cattle and lambs, as determined by the Agricultural Marketing Service, are used in the formula for calculating current fees. The following table shows that average grazing fees per animal month for 1957 are one cent lower for cattle and one-fourth cent higher for sheep than in 1956:

1956	Cattle 35¢	Sheep 8.75¢
1957	Cattle 34¢	Sheep 9¢

Fiscal year 1957 grazing receipts from national-forest lands were \$2,682,349, compared with receipts of \$2,906,282 in fiscal year 1956.

Continued emphasis is being placed upon analysis of condition and trend of range allotments. Rate of accomplishment in this important technical job, which includes preparation of management plans and solicitation of permittee cooperation, was stepped up in fiscal year 1957 with the increased funds provided. Recent progress reports from the regions show a total of 1,926 allotment analyses completed out of a total of 8,790 allotments to be covered. The 22 per cent of the job shown as completed does not take into consideration those allotments in various stages of completion at the present time. Range Units in unsatisfactory condition, or where conflicts with other uses are acute, are being given first priority.

#### Range Revegetation

Approximately 52,500 acres of national-forest land were reseeded and 56,500 acres were treated for removal of competing vegetation in fiscal year 1957. Based on a recent re-evaluation about 5,900,000 acres in a poor to depleted condition remain to be treated.

The Forest Service, Bureau of Land Management, Bureau of Indian Affairs, and Soil Conservation Service continue to cooperate through the Forest Service Equipment Development Center at Arcadia, California, to test and adopt commercially available equipment for use on wildlands and to develop any special equipment needed for seeding, noxious plant control, and other range improvement work. This equipment development work has been instrumental in the greater accomplishments made to date at a lower cost than would have been otherwise possible. Interagency pooling of requests for heavy seeding and other equipment on a consolidated bid basis has resulted in a saving of time and funds.

#### Range Improvements

Funds appropriated for this work the past fiscal year were used to the fullest extent possible to maintain the approximately \$19 million investment in fences, driveways, and water developments. In addition, special effort was made to secure permittee cooperation in money, time and materials. Permittee cooperation has increased in spite of lowered market prices and the fact that most permits are small, i.e., average cattle permit in 1955 was 69 head; for sheep 1,233 head. The cooperation thus received has helped the program. Improvements constructed in fiscal year 1957 are as follows:

241 (Mi.) Fences  
17 (Mi.) Driveways  
307 (ea.) Water Developments

Range improvements such as fences and ponds provide needed controls for proper range management. Such measures help to sustain forage production.

#### Soil and Water Management

Municipal Watersheds -- Increasing attention is being given to use and management of resources in municipal watersheds without causing damage to water supplies. Plans have been made to test timber marking and logging methods to be applied to virgin timber stands in the watershed in Rogue River National Forest which supplies Ashland, Oregon. Overpopulation of big game has been causing considerable watershed damage in the watershed supply in Walla Walla, Washington. This watershed is fenced and has been closed to use for many years. With the consent of the local people, and after a long continuing effort by the Forest Service, a hunt was held to reduce the elk population, with a view toward balancing big game numbers with available forage and improving watershed cover. More hunts are planned. The Forest Service has entered into cooperative agreements with the cities of Bradford, Pennsylvania, and Medford, Oregon, to provide professional assistance in planning and conducting logging operations in the city-owned municipal watersheds.



Soil Vegetation Surveys.--Work was started to develop a pilot program to appraise the value of soil-vegetation surveys in managing the national forests and to develop methods adapted to the requirements of wild land management. This work is an extension, with a view toward application on a Service-wide basis, of soil survey work which has been done in several regions by various degrees of intensity to meet specific regional needs. Pilot areas for survey and study were selected in two regions.

Watershed Rehabilitation.--Watershed rehabilitation work was expanded in the past year to include some 55 projects on 43 national forests. Work was continued from the previous year on 14 projects and begun on 41 new ones. Methods were developed to control and restore to usefulness very large gullies in the southeastern Piedmont region. Work was completed on the Boise National Forest on a small upstream watershed which was flood source area that menaced lives and property. Watershed rehabilitation work done in the past two years on the municipal watershed of the town of Marion, Virginia, Jefferson National Forest, demonstrated its effectiveness during the severe floods in southwestern Virginia in January 1957. The stream in the watershed ran clear and within its banks all during the flood period, in sharp contrast to muddy, flooding streams in nearby areas.

Effects of Streamflow.--A program to evaluate the effects of national forest resource management practices on streamflow was started on the 275,000 acre Beaver Creek watershed, Coconino National Forest, Arizona. The watershed is a tributary of the Salt River system and located in a region of critical water shortage. The work is a joint effort of the administrative and research branches of the Forest Service. It will be concerned with the manipulation of range and timber resources by standard management methods and modifications thereof which are considered likely to induce increased water yields. The major objective of the program is to determine whether and to what extent water yields may be improved by resource management without detriment to other resources. The U. S. Geological Survey is cooperating in stream gaging.

#### Mining Claims, Mineral Permits, and Leases

Continued progress has been made in the determination of surface rights of mining claims under the Act of July 23, 1955, as shown by the following summary:



Surface Right Determination - Act of July 23, 1955

Progress to June 30, 1957

	Number of Areas	Acres	Estimated number of Mining Claims
Surface right determination to be done <sup>1/</sup> 1,000		102,691,000	750,000
Field examinations during 1957 .....	94	9,454,000	108,900
Total field examinations completed			
6/30/57 .....	102	10,023,500	116,100
150-day publication period expired .....	31	2,773,600	34,000
Determination job complete .....	6	505,000	595

1/ Estimated

Examinations on account of applications for mineral patents on national-forest land have increased during the year. In cases where there is evidence that the applicant has not complied with the requirements of the mining law protests are filed with the Bureau of Land Management and hearings are held. Where it appears that nonpatented mining claims are being used for purposes not related to mining, examinations are conducted and when indicated the validity of claims is challenged. Claim examination and protest work requires expert technical knowledge of geology, minerology, and mining engineering.

Mineral permits and leases on acquired lands are issued by the Bureau of Land Management, with the consent of the Forest Service. Mineral leases under the Mineral Leasing Act of 1920 are issued by the Bureau of Land Management, provided that the Forest Service determines that mineral exploration may be carried out without serious adverse effects on watershed and other surface values. Special conditions are inserted in leases to protect such values. The determination of whether or not mineral development is in the public interest involves many important decisions by Forest Service field people.

Mineral Leases as of June 30, 1957

	<u>Number</u>	<u>Acreage</u>
Acquired Land Leases .....	2,515	2,187,758
Mineral Leasing Act Leases .....	8,643	10,185,367

### Miscellaneous Land Uses

More than 100 different kinds of uses of national forests are covered by special use permits. These authorize the use of national-forest land for such purposes as pastures, ski lifts, sawmills, power lines, television transmitters, and many others. About 40,000 special use permits of all types are now in effect. This does not include about 17,000 permits for resorts, winter sports areas, and summer homes which are reported under the "Recreation-Public Use" project.

Special use permits are issued to individuals, local government agencies, nonprofit groups, and commercial organizations.

Permits for uses of a domestic or nonprofit nature are issued free or for a nominal charge. For commercial uses the fee is based on the actual value of the land for that purpose. When a competitive interest exists for the same proposed commercial permit the permittee is ordinarily selected by competitive bidding. Careful administration of special uses is necessary to allow developments that will serve the needs of the public without damaging other important national forest values. Revenues from special use fees amounted to \$1,113,739 in 1957 and \$1,071,617 in 1956.

The present strong activity in the fields of highway construction and hydroelectric development brings about many additional land use management problems. Major highway rights of way and reservoir areas often require removal of existing permitted uses and cause difficult adjustment problems.

### Mapping

During fiscal year 1957, the Forest Service completed planning sheets for 23,200 square miles, equivalent to 125 - 15 minute quadrangles. These sheets serve as original manuscripts for the compilation of national forest planimetric maps. They also serve in their present form for a variety of forest management purposes including resource inventories.

Topographic map manuscripts to serve forest management needs were completed for 11 - 7-1/2 minute quadrangles totaling 630 square miles. The manuscripts conform to national mapping standards and are therefore furnished to the U. S. Geological Survey where the manuscript is edited and published as part of the U.S.G.S. series.

The experimental phase of utilizing first order photogrammetric instruments for cadastral surveys was completed. Methods and procedure have been established for execution of surveys. The next phase is to obtain concurrence of legal authorities for substitution of photogrammetric surveys for ground surveys in retracing or defining national forest boundary and property lines. Byproducts of tests for accuracy of



cadastral surveys include proof of adequacy of photogrammetric surveys for site plans, cross sections, profiles, and earth work computation for bridges, administrative facilities, airports, and recreational areas.

Aerial photography was contracted during fiscal year 1957 for 10,739 square miles required primarily in connection with the mapping program. In addition, photography for 39,304 square miles of national forest area was contracted for use in the management of timber and other forest resources. The latter photography will also be used ultimately in mapping activities.

#### Land Exchange

Congress has passed about 90 laws authorizing the exchange of national forest land and timber for private or State lands intermingled with or adjacent to the national forests. The objectives of these laws are to promote consolidation of the national forests for more effective land and water conservation and more efficient management. During the fiscal year 1957, 56 exchange transactions were approved. Of these transactions, 55 were exchanges of national forest lands for private, State, or county lands within the national forests. 54,984 acres will be granted to the Government and 47,598 acres will be conveyed by the Government. These exchanges will block in national forest lands and will also help consolidate or build up private properties or State conservation units. One transaction is an exchange of national forest timber for 2,480 acres intermingled with national forest lands.

Additionally, 45,700 acres of national forest land within Los Padres National Forest, California, were exchanged for 25,890 acres of military lands in Hunter-Liggett Military Reservation under the Act of July 26, 1956 (P.L. 804, 84th Congress). Purpose was to achieve more effective use and management of the public lands involved.

Recent studies indicate that about 1,885,000 acres of isolated, scattered, or checkerboarded national forest lands should be exchanged for intermingled private, State, or county lands to achieve needed ownership consolidations, permit desirable national forest boundary adjustments, meet needs of communities for growing space, and otherwise adjust ownership patterns for most effective use and management of lands in and adjacent to the national forests. To promote an efficient and effective national forest land status pattern, land exchange during the next five years should dispose of an average of 240,000-250,000 acres of national forest lands annually and acquire an equivalent value of lands better suited and better located for national forest purposes.

#### Management of Land Utilization Projects

The Forest Service, as of June 30, 1956, had responsibility for administering, in accordance with provisions of Title III of the Bankhead-Jones Farm Tenant Act, approximately 7,035,000 acres of Federal land

in 77 separate projects. The acreage under the jurisdiction of the Forest Service was reduced somewhat during fiscal year 1957. The 1959 budget contemplates a reduction of about 2,000,000 acres during fiscal year 1958 through transfer to the Department of the Interior. In addition, the Forest Service was responsible, as of June 30, 1956, for approximately 62,000 acres of land in 9 areas managed under longterm lease by non-Federal public agencies. All but about 9,000 acres of these lands were conveyed to the lessee agencies during fiscal year 1957 and transfer of most of the remaining 9,000 acres should be accomplished during 1958.

Six land exchanges to promote better consolidation of land ownerships and so facilitate management and conservation activities were approved. In these, the Government will convey 3,938 acres and will obtain 3,721 acres.

Grazing is the primary use of most of the projects. During calendar year 1956, 6-1/2 million acres of these lands were grazed by 339,000 head of livestock owned by 5,098 permittees. Timber production is the principal use on about 1/2 million acres from which approximately 25-1/2 million board feet of timber and timber products were harvested during the year ending June 30, 1956. Other permitted uses of these lands include operation of recreation areas; limited amounts of cropping, haying, and grass seed harvesting, under agreements and permits issued by the Forest Service; and operation under mineral leases and permits handled by the Bureau of Land Management of the Department of the Interior.

Income from these various sources for calendar year 1956, which was \$126,000 greater than for the previous year, is shown in the following table:

Grazing .....	\$765,563
Forest products .....	279,422
Mineral leases and permits .....	809,324
Cropping, haying, and seed harvest .....	38,606
Recreation .....	30,484
Other .....	<u>42,156</u>
Total .....	1,965,555

The objective of management of these projects is to develop and utilize the resources of the land to the fullest extent that is consistent with safe land use. The serious drought conditions that have existed in the Great Plains during the past four years have emphasized the importance of accelerating needed development work on projects in this region to prevent serious loss of soil and of resource values and to obtain more complete utilization of the available forage. Needs include particularly fencing, reseeding, water developments, rodent and noxious weed control, and soil erosion control. In programing development work, emphasis is being concentrated on the 1-1/4 million acres of project land in the dust bowl area of Colorado, Kansas, New Mexico, Oklahoma, and Texas.



## Forest Fire Control

Greater emphasis has been placed on fire prevention and further mechanization of the fire fighting force. Personal contacts with forest users, law enforcement, the national cooperative prevention campaign, and many other efforts have reduced man-caused fires from a 5-year average of 5,770 to 4,797 in 1956. An increased manning experiment underway on the Mississippi national forests shows that man-caused fires can be reduced a significant amount where additional prevention forces are made available. An 80 percent increase in funds was used for strengthening prevention effort. The annual number of man-caused fires was reduced from 654 in 1954 to 356 in 1956 on the Mississippi forests. Incendiary fires were reduced from 379 to 165 in the same period.

A number of important administrative projects are underway. Review and revision of national fire control instruction is in progress, as is the preparation of the first national technical handbooks for fire control. Previously, each region had its own handbook. A national replanning project now starting should determine the current needs for an adequate fire force for the Forest Service by individual national forest units.

### The 1956 Fire Season

The fire season varied greatly in different parts of the country. The severe spring season in Arizona and New Mexico continued into summer with many lightning and man-caused fires. Danger there gradually lessened through July. Southern California's extended drought continued throughout the year and was directly responsible for several extremely destructive and costly fires. The San Bernardino and Cleveland Forests in California were hit hardest and each had a bad fire in late November as well as large fires earlier. The fire severity index for nearly all southern California was above 1955 (a bad fire year) and far greater than the average for the preceding eleven years. Chart I shows the potential fire job (load) for a portion of the San Bernardino Forest. Other southern California areas had similar conditions.

A bad situation developed on State and private areas outside the Angeles National Forest in late December. The forest Service was able to assist State and local forces in several major fires there. Mutual aid arrangements were also very effective in many other places throughout the country where Federal forces assisted local forces or vice versa.

Construction and Maintenance of Structural Improvements

Funds for this purpose cover primarily structural improvements for fire control and general administrative purposes including timber sales. Maintenance during recent years is based on a relative priority selection of the most urgent projects within classes of improvements such as lookouts, barracks, storage facilities, offices, dwellings, telephone lines, etc.

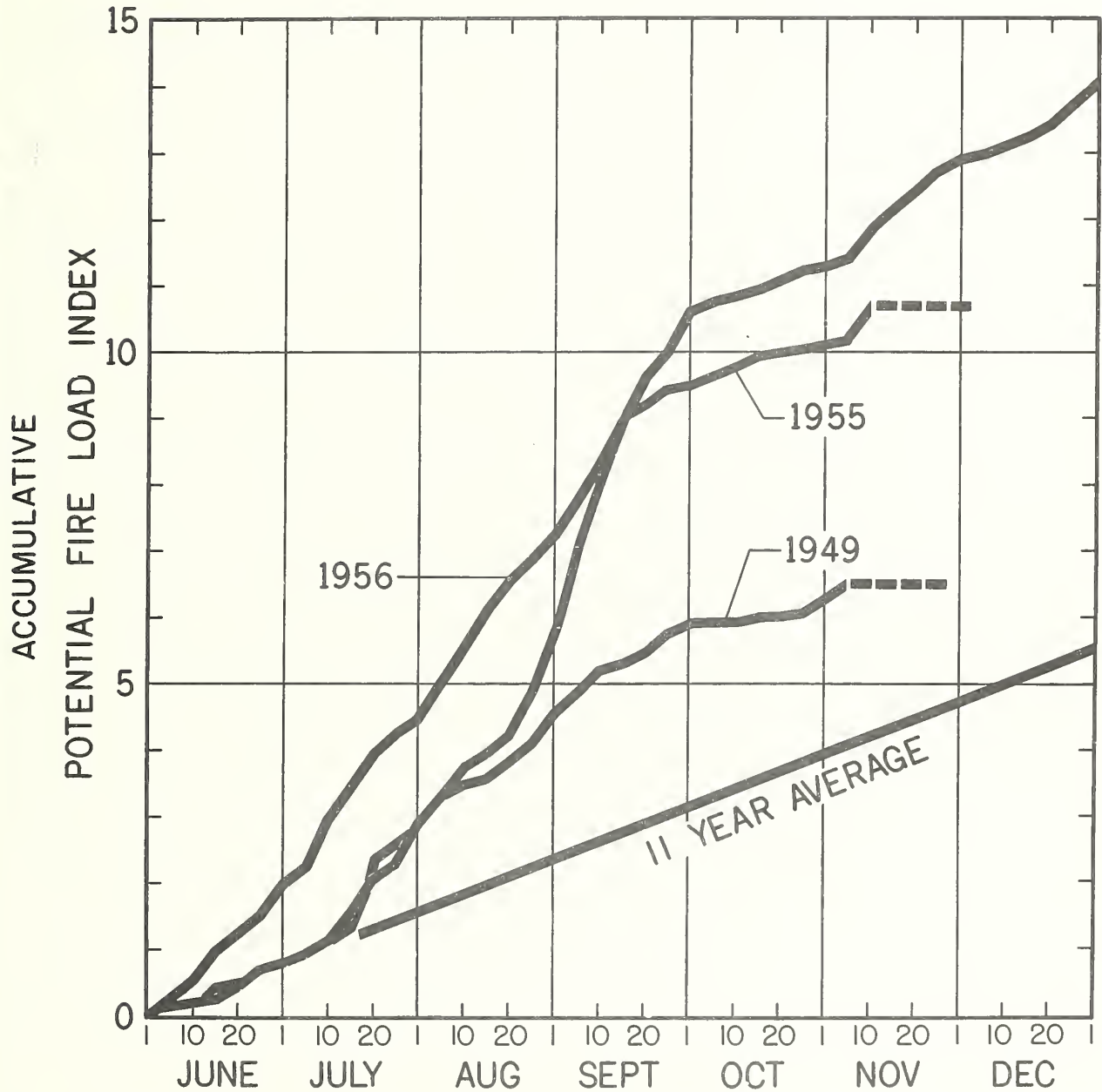
Construction funds have been used to take care of some of the most critical requirements for replacement of existing plant and for urgent additions. The \$1,000,000 increase in appropriations for housing construction in fiscal year 1957 made it possible to construct a total of about 60 dwellings. This increased housing program enabled the Forest Service to meet some of the more urgent needs for housing in areas where employees were living in substandard dwellings or trailer houses.

The \$2,000,000 increase, appropriated by the Congress for construction of improvements in fiscal year 1958, will provide for faster progress in meeting housing needs. Present plans are for construction of approximately 135 dwellings and dormitories, plus urgently needed service buildings and fire control structures.

Chart 1

# FIREWEATHER SEVERITY SOUTHERN CALIFORNIA

RATING AREA 1 - SAN BERNARDINO NATIONAL FOREST



This chart shows the variation in potential fire job (load) between years as caused by weather.





## Fighting Forest Fires

Current Activities: This program covers fire fighting on the national forests and the buildup of emergency fire fighting forces under peak burning conditions. Experience has demonstrated that material savings can be made by having a strong force ready to discover, and to attack and stop fast spreading fires while they are small. Expenditures for the regular fire control organization are financed from the activity "National Forest Protection and Management." The temporary buildup in force to handle severe burning conditions and expenditures for suppressing fires come from the Fighting Forest Fires program.

### Significant Fire Control Facts:

1. The average size of fire was reduced in the past year from 27 to 20 acres (26%). Thus the program to reach fires and contain them while small is producing results. Recent increases in the regular organization and more air operations helped make these gains.
2. Air attack is increasing and holds promise of doing an even greater part of the fire fighting job. Air tankers cascaded a sludge of water and sodium calcium borate in advance of spreading flames effectively on 23 fires in California in fiscal year 1957.
3. Helicopters were flown 2,000 hours to lay fire hose over rough terrain, transport men for fast initial attack, scout fires, carry supplies, and perform many other fire fighting duties. Private helicopters were contracted by the Forest Service for this use.

Illustration No. I shows effective use by helicopters on a fire on the Angeles National Forest in July 1956. This fire covered 40 acres, required \$12,000 to put out, and did \$6,300 damage to the watershed. Without helicopters, it is estimated this fire would have covered 850 acres, cost \$100,000 to control, and would have done \$834,000 damage to the watershed.

4. The 300 smokejumpers used in the western national forests made 1,490 fire jumps and their use is estimated to have saved \$1,360,000 in fire fighting costs.

An additional base for smokejumpers was established in Redding, California, during the fiscal year.

5. More effective cooperative arrangements with the military services were placed into effect in fiscal year 1957. The Air Force now has orientation training in natural resources for pilots and other key men. Training flight routes take into consideration fire dangers of wild land areas. Close liaison

is maintained between local military units and forestry agencies. Information on research and development in fire control is being exchanged currently between the Forest Service and Department of Defense agencies.

6. There are still too many fires and damage losses are much too great for fully effective management of the valuable resources that are being protected. There were 12,466 fires on areas protected by the Forest Service which burned over 257,771 acres in calendar year 1956.
7. Continued rising costs mean fewer men and machines for the same money. A lookout or fire crewman costs three times more today than 15 years ago. Fire equipment costs doubled between 1940 and 1950 and have continued to increase.
8. Increased use of the forests means greater chances for fires to start. Industrial activity in timber cutting and mining, and recreational use by the general public have shown big increases. There were 52.5 million visits to the national forests in 1956 compared with only 18.2 million in 1946. Timber cutting is up from 2.9 to 6.9 billion board feet in a like period. This creates more hazardous fuels in which fires can spread rapidly but means that there are more woods workers and more machines in the woods to help fight fires.



# Illustration 1

Mt. Wilson Observatory,  
Television installations,  
resort; elevation 5700 ft.

## HELICOPTER

1. Moved 15 men from base heliport on road, to head of fire, in 20 minutes. Without 'copter, first crews would have arrived, almost exhausted, at least one hour later

2. Dropped hose, water, tools here.

Fire started here,  
elevation 1700 ft.

Cities of Arcadia  
and Sierra Madre

## "HALFWAY" FIRE

July 6, 1956

Angeles National Forest  
California Region

	Actual Burn (Solid Line)	Potential Burn (Broken Line)
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Condition:	Helicopter initial attack.	Same except no helicopter
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Size:	40 Acres	850 Acres.
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Suppression Cost:	\$12,000	\$100,000
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Watershed Damage:	\$6,200	\$834,600
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Insect and Disease Control

Current Activities: National policies to protect and preserve forest resources of the United States from destructive insects and disease are established by two Acts. One, approved April 26, 1940, authorizes control of the blister rust disease of white pines; the other, the Forest Pest Control Act, approved June 25, 1947, authorizes control of forest insects and other forest tree diseases. Under the provisions of these acts the Secretary of Agriculture has designated the Forest Service as the agency responsible for conducting the forest pest control programs authorized by them. These responsibilities include detection and appraisal surveys of forest insects and diseases, providing leadership and cooperation in the execution of forest pest control programs on State and privately owned lands and for control activities on national forests. Also, cooperation is maintained with various units of the Department of the Interior which are responsible for control activities on lands under their jurisdiction.

Although native insects and diseases are constantly at work in the forests, they are normally held in check by such natural factors as parasites, predators, diseases, and adverse weather. Periodically these natural factors are not effective and certain insects and diseases then develop to epidemic proportions killing and damaging large quantities of timber. Another threat is the accidental introduction of pests into this country from abroad, such as the white pine blister rust, the European pine shoot moth, and the balsam woolly aphid. Introduced pests are usually particularly destructive because predators, parasites, and diseases normally affecting them are absent in the new environment.

Effective control action requires (1) the detection of outbreaks in their early stages, (2) an evaluation of the biological significance of the outbreak to determine the need for control, (3) pre-control work to determine the scope of the control problem acreages or number of trees to be treated, land ownerships involved, costs, economic justification and values at stake, and specific plan for control either by management or by direct measures, or both, and (4) the application of prompt control action.

Control of forest insects and tree diseases, like control of fire, can be attained with minimum damage and expense by locating and suppressing outbreaks that do develop while they are small. For this reason emphasis is being given to strengthening prevention and prompt control action by:

- (1) Developing awareness of the forest pest problem among forest owners and managers.
- (2) Increasing the effectiveness of field forces by training programs.
- (3) Giving increased leadership, particularly in developing strong cooperative approaches to the pest problem with state agencies and with industry.

- (4) Giving increased attention to the forest management steps that can be taken as preventive measures and as a means of control.

#### Selected Examples of Recent Progress

##### White Pine Blister Rust

###### Status of Control Program

1. Total acres in control programs .....23.2 million
2. Acres not yet worked initially ..... 1.1 "
3. Acres worked initially but where rust is not  
yet controlled ..... 4.1 "
4. Acres where rust is controlled .....18.0 "

The establishment of control is not as nearly completed costwise as indicated by acreage accomplishment, due to the expensive control work remaining in the West. In the western white pine region of Idaho and the sugar pine region of California and Oregon control has been established on but one-third of the 2 million acres in the control area for these States. The remaining two-thirds represents costly work due to dense ribes populations, rugged terrain, the distance of white pine area from source of labor, which necessitates the establishment and operation of forest camps, and high rust hazard making it essential that control work be unusually thorough. The rust situation in northern Idaho is particularly critical and a large proportion of available funds is programmed to expedite control in that area. Likewise, the State of Idaho and the local forest protective associations are making additional funds available for cooperative control work on State and private lands.

###### During 1956:

1. Initial work was done on .....152,242 acres
2. Rework was done on .....490,538 "
3. Maintenance work was done on ..... 79,571 "
4. Ribes destroyed totaled .....13.5 million bushes
5. Survey work to determine pine stocking and  
ribes regeneration was done on .....2.2 million acres.



6. Killing infection was removed from 22,600 white pine trees to salvage them for their important aesthetic or crop tree value.
7. Sixty-one camps were established and operated in western areas and 2,000 seasonal workers employed. In addition, 570 contracts were awarded on a competitive basis for control work.
8. Funds contributed to control work by the States, counties, towns, and landowners for work on State and private land totaled \$725,000--an increase of \$13,000 over 1955 and \$74,000 over 1954.
9. A forest genetics project was activated in cooperation with the University of Idaho for the purpose of eventually producing western white pine planting stock which will be resistant to blister rust infection.

#### Insects and Diseases other than Blister Rust:

##### Detection and Appraisal Surveys

##### Forest Diseases

Dwarfmistletoe widely distributed and causes heavy losses in western conifers. Roadside strip surveys converging 1,440 miles in the Southwest revealed dwarfmistletoe on 25 percent of the ponderosa pine, 44 percent of the Douglas-fir, 17 percent of the spruce, and one percent of the true firs. Similar surveys covering 920 miles of roadside strips in the northern Rocky Mountains revealed dwarfmistletoe on over 70 percent of the area surveyed with infection heavy in western larch, Douglas-fir and lodgepole pine. Severe losses were observed in California in red fir and sugar pine stands, and in Oregon in white fir stands.

Biologically sound control through silvicultural treatment has been demonstrated for dwarfmistletoe on ponderosa pine in the Southwest but the economic practicability of such methods has yet to be determined. Studies of control through use of selective herbicides must be continued before recommendations for their use can be made.

Elytroderma needle blight common on ponderosa pine throughout the West. Appreciable losses have occurred on about 10 percent of all pine acreage in the Northwest, with serious losses on less than one percent. Increased damage was observed in California in both ponderosa and Jeffrey pine stands in the Sierras and in ponderosa pine in the Coast Range.

Pruning may have a place in the control of this disease but more conclusive experimental evidence is required.



New and potentially serious needle blight on ponderosa pine widely distributed in Southwest. A needle disease, similar but probably distinct from Elytroderma needle blight, has been found on several thousand acres in the Prescott and Coconino National Forests of Arizona and the San Bernardino National Forest of California. Until the cause has been determined no control recommendations can be made.

Hypoxylon canker kills from 1 to 2 percent of the aspen volume in the Lake States annually. This loss exceeds one million cords per year. Evidences of less infection in well-stocked stands suggest that appropriate management practices may reduce losses.

Sweetgum blight continues to cause serious mortality in Mississippi. Losses in the 3-year period prior to 1956 amounted to 14 percent of the sweetgums on 41 plots in 6 locations. In 1956 an additional 2 percent died. Any recommendations for control must await results of research on determination of cause.

Nematodes common in forest nurseries in Southeast. A survey of 32 southern nurseries disclosed 6 species of nematodes widely distributed in large numbers. Several plant parasitic forms were included but their significance has not been evaluated. Evidence accumulated to date suggests that treatment for control of nematodes may be effectively combined with fungus disease control in forest nurseries.

#### Forest Insects

Cooperative action increased the scope and intensity of surveys to detect outbreaks of forest insects. Private timber owners and public land managers increased their participation in cooperative surveys to locate insect outbreaks in their early stages and thereby made detection more certain and efficient. The cooperators were instructed in how to recognize the major forest insects and were provided forms to report their findings. Trained technicians promptly made on-the-ground inspections of reported outbreaks to appraise their potential significance and to determine the needs for their control.

Tree-killing by the Engelmann spruce beetle varies in intensity in Rocky Mountain States. The rate of tree killing caused by Engelmann spruce beetle in the Rocky Mountain States has been found to vary from low endemic levels to outbreak proportions. Areas of heavy beetle activity which were found in western Wyoming, northern Montana, southern Colorado, northern New Mexico, eastern Oregon, and Utah are being controlled by salvage logging, trap-trees, and insecticidal sprays.

Surveys reveal epidemic centers of southern pine beetle in southern and southeastern States. Heavy populations of southern pine beetles have caused extensive killing of pines in many of the southern and southeastern States during the past several years. Infestations are now most severe in North and South Carolina, in eastern Tennessee, and in portions of Mississippi and Alabama. The first recurrence of the insect in over 40 years was found in Louisiana during 1956. Concerted efforts on the part of public and private landowners are being continued to bring these infestations under control.

Outbreaks of Black Hills beetle cause severe tree-killing in South Dakota and Utah. New outbreaks of the Black Hills beetle were found in portions of the Black Hills of South Dakota and infestations of long duration continued at epidemic levels in the pine stands of southern Utah. Deficient precipitation during the past several years presumably has reduced tree vigor and thus enabled the beetles to increase in numbers. Concerted efforts are being made to control these outbreaks by logging and spraying the infested trees.

Outbreaks of mountain pine beetle widespread in western States. Surveys showed that infestations of mountain pine beetle developed to serious proportions in many areas in the western States during 1956. The outbreaks occurred primarily in the lodgepole pine stands of California, Oregon, Washington, Montana, Utah, and Wyoming. The insect also caused severe tree-killing in ponderosa pine in California and Oregon, and in sugar pine and white pine in Washington, Montana, and Wyoming. Control efforts are being intensified to suppress beetle populations by spraying or salvaging the infested trees.

Black-turpentine beetle destructive to pines in southern States. Surveys have shown that the black turpentine beetle was particularly abundant in the southern States during 1956. The beetles were found in large numbers in pine stands which had recently been logged or in areas which had been worked for naval stores. Outbreaks of severe proportions occurred in the pine producing areas in east Texas, Louisiana, Mississippi, Georgia, and parts of Florida. Prompt initiation of control practices is preventing the outbreaks from spreading and becoming more severe.

Decline noted in amount of tree-killing caused by Douglas-fir beetle during 1956. Surveys have shown that tree-killing caused by the Douglas-fir beetle in the western States is much less than it has been for the past several years. There are, however, a few areas in Washington, Idaho, Colorado, Utah, and New Mexico where outbreak conditions are resulting in severe tree-killing. Salvage of infested trees is being used as a measure for control.



Severe infestations of spruce budworm found in coniferous forests from coast to coast. Surveys have shown that outbreaks of the spruce budworm occur throughout most of the susceptible timber type in the United States. Infestations are most severe in the fir stands of Montana, northern and southern Idaho, eastern Oregon, northern Minnesota, and Maine. The total outbreak area is in excess of 10,000,000 acres and aerial spraying is to be continued to prevent the loss of large volumes of valuable timber.

Severe infestations of needleminers continue in California and Utah Surveys have shown that the needleminer infestations affecting lodgepole pine at Yosemite National Park in California, and the one affecting white fir at Bryce Canyon National Park in Utah, continued in epidemic status during 1956. Tree-killing is becoming widespread in the affected areas due to defoliation by the needleminers and to attack by bark beetles in the weakened trees. Thus far, efforts to control these insects have been unsuccessful. New insecticidal formulations are being tested against the needleminer and increased efforts are being made to control the bark beetles.

Balsam woolly aphid highly epidemic in Oregon and Washington. The extent and severity of balsam woolly aphid infestations were found to have increased materially in Oregon and Washington during 1956. The outbreaks expanded from 295,000 acres in 1955 to 356,000 in 1956 and tree-killing reached serious proportions in the Cascade Mountain Range in Washington. This insect was accidentally introduced into the United States from Europe and effective methods for use in its control have not yet been developed.

Epidemic infestations of European pine shoot moth develop in Lake States and Central States. There was a marked increase in the severity and extent of European pine shoot moth infestations in the extensive pine plantations throughout the Lake States and Central States regions during 1956. Serious injury was particularly noticeable in the red and Scotch pine plantations of Lower Michigan and the insect was found to have spread to large areas in portions of Wisconsin. In some areas in Ohio and Indiana the moth damaged as much as 90 percent of the shoots on 4-8 year old plantations. Techniques developed by research are being tested for control in Michigan and Ohio.

Spruce Mealybug outbreak found in southern Utah. Surveys have shown that some 60,000 acres of spruce timber is infested by the spruce mealybug on the Fishlake and Dixie National Forests in southern Utah. The insect is causing serious damage to trees of all ages in the outbreak areas. Suitable measures have not yet been developed for control



Texas leaf-cutting ant damages pine plantations in southern States. Pine plantations in east Texas and in Louisiana were seriously damaged during 1956 by the Texas leaf-cutting ant. Surveys revealed that infestations were more widespread in both States than in former years, presumable because of the drought in those areas. Although control of the ants is being intensified, there is need for additional research toward improvement in control practices before the problem can be fully met.

#### Control Accomplishments

##### Bark Beetles

A total of 305,000 infested trees on some 2,200,000 acres of national forest lands in the Rocky Mountain, Pacific Northwest, and southeastern States were treated to control bark beetles that were causing heavy losses of timber.

An additional 8,778 trees on an estimated 134,155 acres of State and privately owned lands were treated on a cooperative matching basis under the provisions of the Forest Pest Control Act.

In the interest of preventing and controlling insect and disease epidemics an estimated 818 million board feet of down, susceptible, or bark beetle infested timber was removed by commercial timber sales.

##### Defoliators

Aerial application of insecticide was accomplished on 1-1/2 million acres of forest lands to control the spruce budworm to stop tree-killing and growth loss of merchantable timber and extensive loss of reproduction. Included in the above 1-1/2 million acres were some 14,000 acres of intermingled State and private lands that were treated cooperatively, the landowner equitably participating financially.

##### Other Insects and Diseases

Ground or aerial spraying of insecticides for direct control of other forest insects was accomplished on 98,900 acres of federal and 167,530 acres of State and privately owned forest lands. Control measures were applied to reduce losses caused by weevils, sawflies, borers, spittlebugs, cone and seed insects, Ips beetles, tent caterpillars, tussock moth, bark beetles, and other.

Cooperative control agreements were made with nine States for control projects in which Federal Pest Control funds participated to the extent of 25 percent of the total cost of the project.

### Oak Wilt Disease

The cooperative oak wilt control projects in Pennsylvania and North Carolina were continued for control of this disease on State and private lands. These projects resulted in aerial surveys covering 50,000 square miles to detect 400 new infection centers which were subsequently given control treatment by ground crews.

Late in the fiscal year the States of Virginia, West Virginia, and Kentucky applied for federal aid for control of oak wilt. Cooperative agreements have been signed with West Virginia and Virginia. Agreement with Kentucky is pending.

Surveys reveal no significant changes in the distribution of oak wilt. Control projects in Pennsylvania, Maryland, West Virginia, Virginia, and North Carolina have been successful in preventing spread to the north, east, and south of these States and in reducing damage in them.

The following table shows the amounts obligated in fiscal year 1957 and tentative plans for the use of funds in fiscal year 1958 and 1959. The distribution of funds for future work is based on knowledge gained from experience and surveys. Redistribution must be made from time to time as surveys define infestations that are never static. In general, surveys are made in late summer and during the fall or early winter. Precise allocation of funds cannot be determined until surveys are completed.

Obligations, Forest Pest Act Control Projects

Fiscal Year 1957, and Estimates for Fiscal Years 1958 and 1959

Projects	1957	1958 Estimated	1959 Estimated <sup>1/</sup>
<u>Bark Beetles</u>			
Montana-Northern Idaho .....	\$88,420:	\$125,000:	\$75,000
Colorado-Wyoming-South Dakota .....	116,600:	70,000:	60,000
Southern-Southeastern States .....	192,370:	220,000:	200,000
Utah .....	86,292:	119,000:	110,000
California .....	84,562:	50,000:	90,000
Arizona-New Mexico .....	- - :	30,000:	50,000
<u>Defoliators, such as Spruce Budworm</u>			
Montana-Northern Idaho .....	791,877:	290,000 :	283,000
Southwest Idaho .....	502,500:	50,000:	15,000
Wisconsin .....	17,500:	- - :	- -
<u>Forest Tree Diseases</u>			
Eastern States-Oak Wilt .....	22,800:	42,000:	50,000
<u>Miscellaneous Forest Service Projects and Pre-Control Work <sup>2/</sup></u>	353,801:	647,000:	710,000
<u>Department of Interior Insect and Disease Projects</u>	129,795:	117,000:	117,000
Subtotal, Control Projects .....	2,386,517:	1,760,000:	1,760,000
<u>Detection and Appraisal Surveys</u> .....	652,213:	665,000:	665,000
Unobligated balance .....	147,270:	- - :	- -
Total Available or Estimated .....	3,186,000:	2,425,000:	2,425,000

<sup>1/</sup> Estimates of project needs are forecast a year or more in advance of anticipated use. They are subject to fluctuations and adjustments are required between projects depending on new outbreaks that occur and expanded needs on going projects.

<sup>2/</sup> This item provides funds for administration of the Forest Pest Control Act, continuous pre-control activities, and for quick action on many projects across the Nation to stop outbreaks while they are small. Involved are cone and seed insects, wood borers, weevils, spittlebugs, tip moths, shoot moths, aphids, sawflies, chermes, bark beetles, budworm, scale insects, and other forest insects and diseases.



DEPARTMENT OF THE INTERIOR

Insect and Disease Control Projects

Prevention of serious losses from diseases and insects in the forests under the jurisdiction of the Department of the Interior is an important activity under the Forest Pest Control program. Approximately 185 million acres of forests and woodlands are administered by the Department of the Interior, including 7 million acres by the National Park Service, 1 million acres by the Fish and Wildlife Service, 16 million acres by the Bureau of Indian Affairs, 36 million acres by the Bureau of Land Management in the continental United States and 125 million by that bureau in Alaska.

White Pine Blister Rust Control

The objective of the White Pine Blister Rust Control program is to protect the valuable white pine forests from the ravages of the white pine blister rust, a fungous disease of foreign origin. There are 571,672 acres of control area administered by the Department of the Interior, of which 371,248 are under the direction of the National Park Service, 58,959 under the Bureau of Land Management, and 141,465 under the Bureau of Indian Affairs.

In the calendar year 1956, the National Park Service, the Bureau of Land Management, and the Bureau of Indian Affairs collectively destroyed 908,807 ribes on 30,836 acres, of which 5,899 were initially worked and 24,937 reworked. Of the total control area 428,247 acres, or 74 percent, is on a maintenance basis.

The National Park Service has completed its review of the need for control work for the protection of such high elevation white pines as limber, foxtail, bristlecone and white bark pines. Control programs for the protection of the most outstanding examples of these species are under way in several western parks, including Grand Teton, Rocky Mountain, Yellowstone, Glacier and Sequoia-Kings Canyon. The National Park Service has pioneered this program for the protection of high elevation white pines and practically all the protected stands will be located within the national parks.

The Bureau of Land Management has completed its reappraisal of the control problem in southern Oregon following the completion of the exchange of lands between the Forest Service and that bureau in accordance with the Act of November 24, 1954. The revised control program is reflected in the control acreages shown above.

The control work conducted by the Bureau of Indian Affairs lies for the most part in the Lake States where the work is proceeding according to a long time work plan. Because of the extremely favorable climate for rust development in the Lake States, the suppressing of ribes on the Indian reservations is very tedious and slow. Although 97 percent of the Indian control area has been initially worked, only 79 percent has been placed on a maintenance basis.

## Control of Insects and Other Diseases

For many years a program to maintain a low level of infestations and infections and to prevent epidemics within the intensively used scenic and recreational areas of the national parks has been successful in conserving these valuable forests. A number of relatively small but nonetheless important projects are involved in this program. Most of these projects require annual attention to maintain the forests in a healthy condition. Examples of these projects are the bark beetles in the California national parks, the defoliators in the southwestern national parks and monuments, dwarfmistletoe in Grand Canyon National Park, and the oak wilt at Effigy Mounds National Monument. Likewise, there are minor projects of a recurring nature at some of the Indian reservations, examples of which are the walkingstick infestation at the Menominee Indian Reservation and the Black Hills beetle at the Navajo Reservation.

There is a pilot control project of major importance now under way in Yosemite National Park against a lodgepole needleminer which is complicated by an interrelated bark beetle infestation. This pilot control project may eventually develop into a full-scale control program. A similar pilot control project is being carried out for the control of white fir needleminer at Bryce Canyon to develop a practical control program.

Quite frequently infestations involving the forests of this Department likewise concern adjacent forest areas. The following are examples requiring coordinated control:

Mountain pine beetle outbreak in Grand Teton National Park and the adjacent Grand Teton National Forest.

Spruce budworm in Montana where public domain forests are intermingled with private lands and lie adjacent to national forests.

Spruce budworm at the Grand Canyon National Park and adjacent national forests.

Bark beetle infestation at Bryce Canyon National Park and the adjacent Dixie National Forest.

Southern pine beetle infestation which involves the Cherokee Indian Reservation, Great Smoky Mountains National Park, and the Blue Ridge Parkway, as well as adjacent national forests and private lands.

Mountain pine beetle infestations which involve public domain forest lands and state and private forest lands in northern California.



### Acquisition of Lands

These funds are used to acquire lands for the protection of the watersheds of navigable streams and for the production of timber under the provisions of the Weeks Law of March 1, 1911, as amended (16 U.S.C. 513-519, 521).

There are now 55 national forest and purchase units situated in 29 States and Puerto Rico, within which acquisition of lands under the above acts has been approved by the National Forest Reservation Commission and in which lands still remain to be acquired. All but a few of these units are east of the Great Plains.

In the fiscal year 1957, 85 tracts containing 7,341 acres were approved for purchase under the Weeks Law. These included 53 Indian allotment tracts containing 2,930 acres within the Chippewa National Forest in Minnesota. Purchase of these tracts, not suited for habitation and chiefly valuable for forestry purposes, will help consolidate the national forest and at the same time aid the Indians and the Bureau of Indian Affairs in their program of disposing of allotments not useful to the Indians and best adapted to long term forestry projects. The remaining 32 tracts were parcels needed to meet specific administrative and resource conservation needs, such as assurance of rights-of-way, prevention of damage to adjoining public properties, reduction of fire hazards, reduction of need for property surveys, and protection of publicly owned reservoirs. Purchase of these lands at appraised values or less when the owners wish to sell will result in materially increased efficiency and economy in administration of, and increased public benefits from national forest lands. There are many more similar small key tracts surrounded in whole or in part by national forest land and most valuable for national forest purposes which need to be acquired.



## FOREST RESEARCH

The Forest Service conducts research on problems pertaining to all forest land and on the management of related non-forest rangelands, including State and private holdings as well as national forests and other Federal lands.

The research is carried on primarily at the Forest Products Laboratory, Madison, Wisconsin, at nine regional forest and range experiment stations in the continental United States, and at forest research centers in Alaska and Puerto Rico. Much of the research at the regional stations is concentrated at field research centers including experimental forests and ranges where major problems may be studied advantageously.

The research is to a very large extent cooperative with State and private agencies. The following fields of research are under way:

### Forest and Range Management Research

Current Activities: Research under this activity is concerned with the growing of timber and the management of forest properties, the management and efficient use of range forage, and the management of both forest and range vegetation to produce the greatest amount of usable water and a minimum of erosion.

Research in forest management emphasizes the development of methods for quickly increasing the growth rate of forests and hence the permissible annual cut. Emphasis is given to harvest cutting patterns that promote regeneration of the forest or increase growth and quality of residual stands. Also being stressed are measures leading to control of undesirable vegetation competing with crop trees. Methods of reforesting farm lands withdrawn from cultivation, stripped mining lands, and cut or burned-over forests, are being improved through research. The development of hybrid trees for faster and more certain timber production is being studied, as well as improved methods for stimulating gum flow in pines for the production of resin.

Wildlife habitat and range management research emphasizes development of methods and practices for building up or maintaining forage production on forest and related non-forest ranges, and for its efficient utilization by game and livestock, at maximum levels consistent with other values of land for watershed, recreation, timber production, or other uses. Emphasis is being placed on determination of proper intensities of stocking, systems of grazing, and seasons of use for native ranges, seeded ranges, and ranges on which undesirable plants have been controlled. Studies are also under way on the use of fire in the control of undesirable range plants, and the development of methods for restoring and managing desirable forage plants on game ranges.

Watershed management research is directed toward improving soil and cover conditions and practices to alleviate flood and sediment problems arising out of past land use, and toward helping meet urban,

rural, and industrial demands for water of good supply and high quality. Watershed use problems are attacked by obtaining quantitative measurements of the effects of such activities as fire, logging, grazing, and road construction on water supply and quality. Concurrent with these studies are those to determine how to use watersheds for various economic purposes and still provide satisfactory water supplies. Possibilities of increasing water yield through manipulation of the vegetation are being studied. Particular attention is being given to the effects of watershed use and management on study areas as they are reflected in soil-plant-water relations. This provides both an understanding of the cause and effects of given measures and a means of predicting the magnitude of results from applying watershed use and management measures on other areas.

### Selected Examples of Recent Progress

#### Forest Management Research

Tree growth and soil moisture. In the South, it is estimated that it takes 750,000 gallons of water to grow one cord of pulpwood. This figure is based on finding that the average acre of pine timberland in the mid-South transpires and evaporates about 30 acre-inches of soil water per growing season. Normally, summer rainfall supplies about half this amount, and part of the difference is made up by water stored in the soil. The part not supplied is the deficiency which commonly builds up to 15 or more inches by the end of the growing season. However, the timber grower can divert a greater proportion of the available water to the crop trees and at the same time stretch the water supply over a longer portion of the growing season by removing cull trees and undesirable brush and by thinning judiciously.

Soils-site relationships. Standard Douglas-fir site index (productivity) curves have been found to overestimate site index on sand and gravel soils and to underestimate site index on imperfectly drained soil in southwestern Washington. These results indicate the need for new yield tables and site index studies for stands growing on these soils. In the bottomlands of the South, topography, percent of clay, and content of potassium proved to be the most important soil factors in predicting the productive capacity of the land for growing willow oak.

Effect of fire on the soil. The effect of burning logging slash on soils has been found to vary somewhat with different soils and locations in the Douglas-fir region. Severe burning resulted in a serious reduction in the percolation rate of water in the soil; however, severe burns occurred only over a very small portion of the total surface of the slash-burned areas. Light burning, which was much more common than severe burning, did not affect percolation. Generally, then, slash burning does not have serious adverse effects on the moisture properties of the soil. Prescribed burning in the



ponderosa pine type of eastern Washington did not harm, and may have improved slightly, the permeability and associated physical properties of the soil.

Photoperiod and flowering of pines. Many plants will not bloom until a certain duration of light (or dark) is attained. However, the flowering of pine trees does not seem to be governed by any definite photoperiodic requirement. Pine species from all parts of the world, growing in the arboretum at the Institute of Forest Genetics in California, bore flowers irrespective of the fact that day length varied markedly from that of their native habitat. This discovery is of special significance in breeding work and in the production of seed from introduced species or hybrids.

Cone immaturity. Seed from pine cones picked at intervals during a 5-week period in the fall differed greatly in germination habit. Sugar and Jeffrey pine seed, from cones picked before they were ripe, produced many abnormal seedlings which probably would not survive. No abnormalities were found in immature ponderosa pine seed; however, it lost vitality after 2 years in cold storage, as did immature Jeffrey and sugar pine seed. These findings point out the need for making certain that only ripe cones are harvested.

Forest genetics. Hybrid progenies resulting from a cross between eastern and western white pine outgrew intraspecific progenies of either parent. Although the hybrid shows less resistance to blister rust, its increased rate of growth may very well outweigh the greater susceptibility to the rust. A hybrid of shortleaf and loblolly pine appears to be 100 percent resistant to fusiform rust which normally infects loblolly and slash pine. By comparison, 68 percent of a nearby sample of slash and loblolly pine were infected.

Spacing of planted trees. Returns from thinnings made in 15-year-old slash pine plantations on the Harrison Experimental Forest in Mississippi have been sufficient to cover planting costs and carrying charges for all spacings except the widest (9.3 x 9.3 feet). Returns from thinning pine plantations on old fields were about twice as great as accrued costs. Spacings of jack pine plantations at 1-1/2 x 1-1/2, 3 x 3, and 5 x 5 on poor sites in Michigan have proved to be so close that a non-commercial thinning must be made before the stands develop satisfactorily. Seven-by-seven-foot spacings yield commercial thinnings without the additional expense of a release thinning. A 9 x 9-foot spacing proved to be too wide for satisfactory development of the stand.

Pruning. Pruning may be necessary in the future management of certain hardwoods species to enable the owner to grow high-quality hardwood lumber and veneer profitably. Pruning to 18-foot heights in a 9-year-old sycamore stand in North Carolina temporarily caused a 3 percent reduction in diameter growth and a 12 percent increase in height growth. Pruning wounds healed in 1 to 2 years, and epicormic branching was



never serious on crop trees. Results of pruning red and white pine in Michigan show that it is safe to prune up to 50 percent of the total height of the trees. Fifty years later, the value of lumber from a pruned red or white pine tree will average \$10 more than that from an unpruned tree.

Natural regeneration. By following certain simple precautions wind-fall losses resulting from areas clearcut as staggered settings in the Douglas-fir type can be reduced. Some of the more important precautions are: (a) keep cutting boundaries at least 200 feet away from poorly drained or shallow soils, (b) avoid locating a clearcut corner where cutting edges can funnel wind into poorly drained areas, (c) avoid leaving exposed edges at crests and upper slopes of main ridges, (d) when a choice is available, locate the cutting edge through stands of the most windfirm species, and (e) remove trees that have had their root systems damaged by road building.

Bulletins and manuals. During the past year, eight bulletins were published summarizing several phases of work:

Three Farmers' bulletins on the growing of loblolly, slash, and shortleaf pine in the South;

Three technical bulletins on the ecological effects of forest fires in interior Alaska, seed crops of pine trees in California, and decay following logging injury in the Pacific Northwest;

One circular bulletin on pruning pine plantations in Michigan;

One special report on forest and water research projects in Pennsylvania.

"Silvical characteristics of sugar pine," the first of a series of writeups on the silvical characteristics of important forest trees of the United States, has been published. Similar writeups for over 100 additional species are being prepared for publication in a silvical manual--the first of its type since the old Silvical Leaflets of nearly 50 years ago.

#### Wildlife Habitat and Range Management Research

Prescribed burning, grazing and supplemental feeding pay off in the South. In Louisiana, longleaf pine-bluestem ranges, unless heavily utilized, build up a heavy rough that creates poor grazing conditions, a high fire hazard, and unfavorable pine seedbed. Four years after a prescribed burn, fuel buildup on ungrazed-unburned slender bluestem paddocks was 2.7 tons of air-dry fuel per acre. On comparable moderately and heavily grazed paddocks fuel volumes were 1.4 and 0.8 tons per acre, respectively. If ungrazed for one year, forage becomes unpalatable. Well managed herds of cattle receiving cottonseed cake

and other supplements during fall and winter produced an 84 percent calf crop and calves which averaged 440 pounds at ages between 6 and 7 months. By contrast, other range herds in that area produced a 50 percent calf crop and 300-pound calves at 9 months of age.

Water hauling to livestock found practical on unwatered western ranges. Studies in Oregon with cattle and in Utah with sheep have shown that water hauling for livestock where existing water supplies are scarce and too expensive to develop results in more uniform forage use. It places water where forage is available, reduces trailing damage to vegetation and soil, and permits grazing at the most appropriate time. It also provides a practical means of furnishing water during drought periods, and to fenced seeded areas in which water may not otherwise be available or adequate. With the opportunity to graze better stands of forage in formerly inaccessible areas and with less travel from forage to water, animal weights are also improved. For example, a rancher in southern Utah increased his lamb crop from 80 to 110 percent and weaning weights from 60 to 72 pounds by hauling water instead of trailing the sheep to water. Based on hauling water a distance of approximately 10 miles, average costs were computed to be between \$1.00 and \$1.39 per cow month and between 10 and 15 cents per sheep month.

Grass vigor reduced by intensive grazing. In Colorado, comparisons of plant composition, vigor, and herbage production of major species on pine-bunchgrass ranges resulting from 3 intensities of grazing for 12 years showed leaf growth (vigor) was the most consistent plant response, being least under the heaviest use and greatest under the lightest grazing. Arizona fescue and mountain muhly were gradually replaced by less desirable forage species as grazing intensity increased.

Range fertilization increases production on annual type ranges. Herbage production in California on annual type foothill range fertilized with 360 pounds of gypsum (60 lbs. sulphur) per acre averaged 3,200 pounds as compared to 1,997 pounds per acre on unfertilized range. During the first 6 weeks of the 1956 grazing season, daily gains of yearling steers on fertilized range were 0.43 pounds greater per steer and 64.2 pounds greater per acre than from unfertilized range. These increased gains were more than enough to pay for the fertilizer and its application.

Seeding of introduced grasses helps in management of native ranges. Tests comparing grazing use of seeded ranges with native range in southern Arizona show that introduced lovegrasses are more palatable, especially in the winter and spring, than the native species. Management studies of subalpine range in Utah indicate that cattle tend to concentrate on seeded areas causing a reduction in grazing pressure on unseeded range. This demonstrates that through seeding palatable grasses, it may be possible to encourage cattle to forsake formerly overgrazed portions of the range and so allow their natural recovery.



In northeastern California stands of smooth brome grass, intermediate wheatgrass, and crested wheatgrass under a rest-rotation system of use were successfully grazed in common with native bunchgrass types without detriment to the seeded stands or excessive concentration of cattle on the seeded areas.

Big game use of forage resource in Northwest may equal livestock use. Analysis of pellet-group counts on the Starkey Experimental Range in eastern Oregon reveals total use by deer and elk in 1956 to be equivalent to 27 percent of the summer grazing use by cattle. From a review of regionwide trends, it appears that since the late 1940's the estimated grazing use by big game has exceeded the grazing use by domestic animals on forest ranges of Oregon and Washington. Other findings indicate the seriousness of competition between deer and elk and between big game and livestock and the need for research that will aid in harmonizing various uses on forest and related ranges.

Rodent control increases beef production. Studies in California demonstrated that increased forage production as a result of rodent control allowed an increased weight gain of 30 pounds per yearling heifer for every 100 ground squirrels removed. This effect was most evident early in the growing season when competition for forage was most critical.

Seven years required to repair logging damage to forage values. In eastern Oregon and Washington, logging of ponderosa pine caused extensive damage to understory vegetation valuable as forage. Total plant coverage was restored by the fourth year, but this growth was predominantly forbs (weeds). After the fourth year, the forbs began to decline and grasses began to regain their former abundance. By the seventh year after logging, both grasses and shrubs had regained most of their losses. Rate of recovery was fastest on areas subjected to the least logging disturbance. This fact suggests that ways should be found to fit grazing and logging together.

Cattle grazing damage to pine reproduction reduced by moderate use. In central Louisiana damage to longleaf pine reproduction has been found to be directly related to grazing intensity. For example, with moderate grazing which utilized 35 percent of the grass, only 9 percent of a stand of planted pines suffered damage, whereas 60 percent of the planted tree seedlings were damaged by heavy grazing which removed 85 percent of the grass. In Alabama, cattle grazing had no noticeable effect upon establishment and survival of natural longleaf-pine seedlings.

Burning switch cane range in southeast improves forage production. In coastal North Carolina switch cane stands have been found to thin out and decline in productivity under protection from burning. Prescribed burning causes replacement of decadent plants with vigorous sprouts. Though suffering some initial damage, cane range can be satisfactorily renovated within 2 to 4 years after burning, providing grazing is carefully regulated during the summer months. These and other observations suggest that cane range should be prescribed burned at approximately 10-year intervals.



## Watershed Management Research

Soil displacement follows chaparral fire. Granitic soils in Arizona have moved appreciably following a chaparral burn, despite a previous seeding of weeping lovegrass. Although total movement out of the area has been small because most of the displaced materials have been deposited locally thus far, the soil is shifting over the surface toward existing gullies. Such material will likely be flushed out by larger storms. The critical soil and climatic conditions characterizing the chaparral type require careful consideration in respect to the feasibility of prescribed burning for improved forage or water yield.

Vegetative controls of critical gullies under test. Vegetative controls as a means of stabilizing extremely active gullies are being intensively tested in northeastern Mississippi. Soil conditions vary from the rocklike coastal plain parent material to droughty sands and eroded loess soils bereft of organic matter. Tentative results indicate that growth and survival of pine seedlings will vary significantly for the three major soil groups. Valid comparisons of the various treatments on each soil await further tests and analyses. Pine seedlings of various grades and qualities, variously root-pruned and subjected to a range of temperatures to determine their ability to withstand the highly unfavorable conditions existing in these areas, have been planted. Methods utilized to increase survival include planting to different depths, planting in soil collection trenches, post-hole plantings, and the use of mulches and fertilizers.

Hardwood removal increases soil moisture supply. Soil moisture available for loblolly pine seedlings was increased when blackjack oak and post oak growth on a northeastern Mississippi ridge was killed. One year's weekly moisture sampling indicated the greatest savings of moisture occurred where both the hardwood overstory and understory were removed. Intermediate savings occurred where only the overstory was killed, and the least where only the understory hardwoods were removed.

Stand characteristics may significantly affect snowfall disposition. The accumulation, storage, and melt of snow can be significantly influenced by variations in forest density, the distribution of "openings" in the coniferous forest, the nature and density of the low-growing vegetation in the openings, along with slope, aspect, and other topographic factors. Aerial photographs of the Sierra Nevada above 5,000 feet elevation show that even in heavily timbered areas, large openings covered with brush often prevail. Determinations of the effects of these factors will help extend the research findings from experimental areas, by insuring more ready identification of forest areas, the manipulation of which is most likely to produce greater or more equitably distributed streamflow.

Increased water supplies indicated by cutting. Commercial strip cutting in high elevation spruce-fir forests of Colorado may significantly affect the volumes and distribution of streamflow. Preliminary analyses show a marked increase in peak discharge rates caused by earlier and faster snowmelt following experimental strip cutting on the Fool Creek watershed of the Fraser Experimental Forest. Total seasonal water yield was appreciably increased also. Results to date indicate that reduced transpiration losses following logging may be much more important in bringing about increased water supplies than earlier plot studies led the researchers to believe.

Formula to minimize logging sediment damage. A formula for locating logging roads promises to minimize sediment damage from ponderosa pine timber harvesting operations in southern Idaho. The formula, based on observations during above-average as well as average snowmelt and rainfall, utilizes the value of seven roadway characteristics which affect the distance that sediment moves downslope from the road banks. Four variables were found to be highly significant. They are based on characteristics such as sediment flow distance; number of logs and other obstructions to soil movement on the slopes; cross-ditch interval; length of embankment slope; and the road gradient. Some of the factors can be determined at the time the road is being located, while others can be calculated by means of other equations. The formulas and sediment flow distance can be used to decide how wide a buffer strip is needed below a roadway in order to protect stream channels or lower-lying roads from sediment damage. As several of the variables, such as road gradient and cross-ditch interval, are subject to control and since sediment movement can be altered by the use of logging slash or other water and erosion-retarding treatments, the method has considerable flexibility. By modifying these variables, the buffer strip below the road can be widened or narrowed as conditions require, and haul road standards and erosion control requirements can be met. Results of actual tests will be used to further refine the formulas.

Grazing control can reduce harmful soil compaction. Compaction of medium-textured soils by livestock, especially in the bluegrass covered stream bottoms, may be in part responsible for the more frequent flash flows in the Black Hills of South Dakota which have aroused the concern of wildlife managers, fishermen, and other recreationists. Soils within two livestock exclosures protected for 10 and 15 years, respectively, showed a significant reduction in unit weight and an increase in space occupied by the larger pores from the surface down to a depth of 4 inches. However, plots protected only 6 to 7 years did not differ appreciably from those regularly grazed. This compaction, extending to 2 to 4 inches in depth, will gradually disappear under a period of protection amounting to some 7 to 10 years.



## Forest Protection Research (Fire, Insects, Diseases)

Current Activities: This work includes projects concerned with research on the control or prevention of damage by fires, insects, and diseases in forests.

Research on the protection of forest, range, and watershed lands from fire is directed toward reducing losses from fire, better efficiency in application of fire control measures, and toward learning how to use fire beneficially in the management of forests and related range lands. The possibilities of reducing the large number of man-caused fires by improved fire prevention methods are under study. Explorations on reducing the severity of fire-setting lightning storms are being continued. Special attention is also being given to understanding the unexpected behavior of large fires, and to improving methods of attack through the use of airplanes, helicopters, and other devices. Special study is being given to conditions for using fire for hazard reduction, and for control or modification of vegetal cover.

Research on forest insects is directed toward the prevention or control of destructive insect attack on forests and forest products. Damage by insects enters into all phases of forest management from the seed to the mature forest. The development of effective and economical methods of direct and indirect control is dependent upon thorough knowledge of life histories and habits of forest insects including the interrelationships between the insects and their environments. Investigations on direct control methods involve mechanical and chemical methods. Research on improvement of insect survey methods with particular emphasis on use of aerial photographs is an important phase of the work. Control of forest insects by indirect methods such as the use of natural or introduced predators and diseases of insects, and by silvicultural practices designed to prevent the buildup of insect epidemics, offers promise and is being emphasized in the research program.

Research on diseases in forests, forest tree nurseries, and on decays and stains of forest products provides the basic information on the causes of diseases and on practicable and effective methods of combating them. Diseases are caused by fungi, bacteria, viruses, nematodes, and unfavorable environmental conditions. They cause annual losses estimated at many millions of board feet of timber, and complicate management and reduce productivity of forest tree resources. Moreover, decays of wood cause a shortening of its service life in homes, farm structures, poles, posts, and other wood products.

### Selected Examples of Recent Progress

#### Forest Fire Research

Aircraft help put out forest fires. Large scale operational tests of new aerial fire control methods were carried out in 1956 by the fire control organizations of the California State Division of Forestry and of the Forest Service in California. A fleet of seven



airplanes dropped 150,000 gallons of water and chemical on 25 timber, brush, and grass fires during the season. On 15 of these air attack was credited as a deciding factor in assuring control, and on an additional 5 as a definite help to ground forces. This experience demonstrated that air tankers can: (1) hold a small fire until initial attack forces arrive, (2) cool down hotspots so men can enter and work safely, (3) knock down spot fires, (4) build a chemical fire retardant line in advance of fire or where men cannot work, (5) reduce the probability of crown fires, and (6) strengthen existing fire lines. Further analyses and evaluation to guide application are scheduled.

Fire fighting aided by use of sodium calcium borate. Sodium calcium borate mixed with water has proved a valuable aid to fire fighters in the West. Nearly 150 tons of the chemical were used on California fires last year. Fire fighting experts report that only one-third as much chemical mix is needed to put out fire in heavy fuels as when water alone is used. In light fuels such as grass they also report that fires can be knocked down faster when chemical is used. Sodium calcium borate has been tested in both ground pumper and airplane applications. These findings confirm results of preliminary laboratory and field tests started several years ago.

New equipment developed for fire danger measurements. The various fire danger rating systems in use throughout the United States all require the daily measurement of weather and fuel moisture elements. In order to improve their accuracy and to assure their uniformity a recent project has developed new and improved fire weather instruments. One byproduct of this work is a completely portable weather station for use particularly on large fires to provide current weather information needed in planning fire fighting strategy.

Project Skyfire. Cloud seeding experiments in lightning suppression have been carried out successfully in Arizona and Montana. The results show that young, growing cumulus clouds can be modified by seeding them with silver iodide from ground and airborne generators. A mobile radar unit developed for detection, tracking, and analysis of thunderstorms as part of the study demonstrated how radar can perform a very useful role in fire protection throughout the lightning zones of the western forests by locating and tracking local storms.

Forest fires and weather influence. Continuing research in fire behavior has yielded additional clues to the reasons forest fires so often behave in unexpected ways. One series of laboratory model fires has demonstrated for the first time that relative humidity of the air may have an important direct effect on the rate of combustion of volatile fuel components, and thus on fire intensity. This effect may be more important even than the already known effect of humidity in regulating moisture content of forest fuels. A parallel analytical study has produced equations satisfying aerodynamic theory that may prove useful in describing and predicting fire behavior. Conditions are defined by these equations that determine whether

local wind movement will dominate and drive a fire or whether the convective energy of the fire itself will dominate. These represent two different types of behavior important to the fire fighter.

East winds critical in western Oregon and Washington. Dry east winds periodically bring critical fire danger to the western Cascade slopes of Oregon and Washington. Predicting their occurrence and planning local fire control action to cope with them is both important and difficult. Recent study has shown that the frequency of these east winds not only varies by months, but that some altitudinal zones are more frequently involved than are others. This information permits more effective placement of fire crews and equipment to deal with these critical situations.

Jet winds associated with large fires. Analysis of large fires of the last three years in the West indicates that in many instances high rates of spread and intense burning have occurred when the high-level jet stream is somewhere close by. What relationships may exist between these phenomena is as yet unknown. In a concurrent analysis of low-level jet winds in connection with large fires it has been found that these jets vary considerably according to the weather situation producing them.

#### Forest Insect Research

Bark beetle control in pine recreational forests of southern California. Bark beetle-caused losses in ponderosa and Jeffrey pine recreational forests in southern California can be greatly reduced by the selective removal of beetle-infested pines and other pines highly susceptible to beetle attack, according to recent research. This method has already been found useful in reducing losses by these insects in timber-producing areas of northern California.

Woodpeckers aid in controlling the Engelmann spruce beetle. Woodpeckers destroy enormous numbers of Engelmann spruce beetles during periods of outbreak of the insect. According to recent studies, however, their control effectiveness is greatest in areas where beetle populations are on the decline. Thus, they probably play an important role in limiting the duration of outbreaks.

Douglas-fir beetle outbreaks in relation to blowdowns. Recent studies indicate that a direct relation exists between the volume of Douglas-fir blowdown and subsequent tree killing by the Douglas-fir beetle in the Pacific Northwest. No clear-cut pattern seems to exist, however, between the location of blowdown and the location of beetle-killed trees. While most of the latter are located near the windthrown trees, many others occur at distances of a half mile or more from the blowdowns.



Prediction of outbreaks of an important species of bark beetle. According to results obtained in a 12-year study recently concluded, outbreaks of the California five-spined engraver, an important insect enemy of ponderosa pines in California, are related chiefly to accumulated deficiencies in rainfall from April to July, and to the amount of logging slash cut in the spring. This knowledge should be helpful in predicting outbreaks of this insect, and in planning for its control.

A virus disease of the Virginia pine sawfly. A virus disease of the Virginia pine sawfly, a serious pest of Virginia pines in Maryland, was discovered recently. When a supply of the virus, obtained from a collection of diseased sawflies, was applied in the form of a spray to sawfly-infested pines, a high degree of control was obtained. This virus is closely related to another one that has been used successfully in the form of a spray to control infestations of the European pine sawfly.

Biological control of the spruce budworm. Studies of the spruce budworm in Oregon and Washington in 1955 and 1956 showed that populations of the insect were heavily parasitized and that trends were downward in many areas. As a result, plans for airplane spraying of extensive forested areas in 1956 and 1957 were canceled and several hundred thousand dollars in control expenditures were saved.

Borer damage in living trees degrades hardwoods. Insects that bore into living hardwood trees in the South cause serious losses in the value of hardwood lumber, according to a recent mill-scale study of three species of southern oaks--Nuttall, overcup, and willow. Examination of logs from these trees showed that losses resulting from borer attack averaged 28 percent. Losses were much greater in the highest value lumber, averaging 70 percent.

Control of a borer in yellow poplar trees. In recent years, many mature yellow poplar trees growing in western Kentucky have been killed by a boring insect which girdled them at the ground line. Recent studies indicate that the insect can be controlled by spraying the tree trunks with an oil solution of benzene hexachloride and DDT. The spray controls active infestations and also prevents new attacks from occurring.

Defoliation of western hemlock by the black-headed budworm causes serious losses in Alaska. Over 23,000,000 acres of western hemlock in Alaska were defoliated by the black-headed budworm from 1950-55. In 1956, a study was made in some of the most heavily defoliated stands to determine the extent of losses caused. The study area contained approximately 36,000 trees over 11 inches in diameter at breast height. Of these, it was estimated that 4,600 were killed and 10,000 others were damaged. Volume loss was over 7,000 board feet per acre.



Pales weevil control in pine plantations. Further progress has been made toward the development of measures for reducing losses caused by the pales weevil to pine seedlings in plantations in the South. Recent research indicates that pine stands cut over or severely burned during the spring or summer can be planted with pine seedlings the following winter without danger of serious weevil-caused losses.

Preservatives prevent termite damage. In 1944 a series of pine stakes were treated with cupric chloride and creosote, and with cupric selenate by the standard vacuum-pressure process. The stakes were then placed outdoors, where they have remained exposed to termite attack continuously ever since. To date, all of the treated stakes remain free of evidence of termite attack.

### Forest Disease Research

Oak wilt control operations reduce incidence of new infections. In the Southeast oak wilt control by sanitation in two areas reduced the incidence of new infections in the following year by 75 percent in one area and 67 percent in the other. In the Lake States where no control has been attempted, new infections have occurred at a uniform rate for 2 years. This indicates the effectiveness of sanitation as a control method.

Oak flowers serve as infection courts for oak wilt fungus. Red, black, scarlet, white, and blackjack oaks in Missouri were inoculated by injecting spores of the oak wilt fungus into wounds in flowers. Of the 37 trees so inoculated, three trees developed wilt, indicating a strong probability that the infection occurred through the flowers.

Dwarfmistletoe infection reduces growth rate of ponderosa pine. In mature stands, uninfected dominant trees put on twice as much radial increment in a 5-year period as did comparable infected dominant trees. Similar growth reduction occurs in immature stands. Marked growth reduction follows general crown infection and is greater on broomed trees than on those free of brooms.

White pine blister rust occurrence in southwestern Wisconsin correlated with elevation. Rust is practically absent below 900 feet, largely limited to microclimatically cool sites (on north slopes, in cool draws, or in small openings in the overstory) from 900 to 1100 feet, occurs generally between 1100 and 1200 feet, and is common and occasionally severe above 1200 feet. This information will help pinpoint rust control activities.

Poria weirii root rot a serious threat to Douglas-fir. This disease is common in the Northwest and most conspicuous in stands from 70 to 150 years of age. Killing occurs in patches that slowly but constantly enlarge as the fungus spreads from tree to tree through the roots. In such patches the rate of damage doubles every 10 to 20 years. True

firs are as susceptible as Douglas-fir, western hemlock considerably less susceptible, and western redcedar much less so. Salvage cutting and conversion to less susceptible species are recommended to reduce losses.

Pitch streak of turpentine pines: a new and potentially serious disease affecting naval stores production. This disease occurs in south Georgia and north Florida. It is worst on suppressed or intermediate trees that have been wood-chipped rather than bark-chipped. Its cause is still unknown.

Heartrots an important source of loss in southern bottomland hardwoods. Over 1,000 hardwoods have been dissected to determine the volume and extent of heartrot in them. The extent of butt rot can be predicted by hollow length, height of butt bulge, age and size of fire scar, and rot diameter on stump.

Decay in aspen in Colorado correlated to stand age. At 60 years ago 28 percent of the trees are infected, with volume loss amounting to less than 1 percent. At 130 years age all trees are infected with volume loss amounting to about 24 percent.

Sprinkling of cold-decked western hemlock logs retards decay. Green logs stored under sprinkling were 6 percent decayed at end of one year and 7 percent at end of 2 years. Corresponding percentages in unsprinkled logs were 8 and 25.

Covering soil under basementless houses reduces wood decay. Materials used for soil covers must be vapor barriers. A single-step method was developed for testing the stability of vapor resistance of such materials when exposed to fungus attack.

Effect of time and temperature on decay resistance of wood determined. Reductions in decay resistance of white oak, mahogany, Alaska cedar, and Douglas-fir were correlated with various combinations of temperature and time.

Southern pine sapwood siding, if properly used, gives good service even in wet climates. Important factors insuring longtime service are the use of (1) decay-free wood, (2) adequate roof overhang and eaves gutters, (3) sheathing papers no less vapor-permeable than Underwriters' Class D, and (4) dips with water-repellent preservatives.

Decay in ammunition boxes reduced by preservative treatment. Boxes made with wood of low decay resistance and stored outside can be protected by dips or short soaks with water-repellent preservatives.



## Forest Products Utilization Research

Current Activities: The aim of the forest products research program centered at the Forest Products Laboratory and with field projects at the various regional Forest and Range Experiment Stations, is to contribute to the solution of national, regional, and local utilization problems of all types; to increase efficiency in harvesting timber crops; to reduce unused woods and mill residues to a minimum by finding uses for present residues; to develop new products; and to improve the serviceability and lower the costs of existing products. Its broad aim, in brief, is to develop new utilization outlets for thinnings, unpopular and little used species of timber, logging and milling residues, and to make the whole timber crop on farms and other forest lands go further and give better service in a wide variety of uses for lumber, paper, chemical, and other products derived from wood.

### Selected Examples of Recent Progress

#### Forest Products Utilization Research

Cushioning for Aero-Drop Delivery. Paper honeycomb and corrugated cores of various types and treatments were studied for cushioning for shipping containers for aero-drop delivery. The results of the tests substantiate the accuracy of the formula developed for expressing the relationship of energy absorption and angle of static loading. Dynamic tests showed that the energy absorbed by the structure was greater under an impact load than under a static load and indicate good possibilities for the use of cellular paper structures for aero-drop delivery.

Douglas-fir Evaluation: The variation in properties of Douglas-fir from different areas of its growth range and the effect of growth rate and percentage of summerwood on density and strength properties are described in the report "Relationship of Locality and Rate of Growth to Density and Strength of Douglas-fir." The data show that in the moderate and slow growth-rate classes, the specific gravity and strength properties of Douglas-fir grown in the Rocky Mountain area are lower than those of wood grown in the coastal area, the Cascades, and the Sierras. The wood grown in the Rocky Mountains tends to have smaller percentages of summerwood at any growth rate than the wood grown under the more advantageous conditions in the coastal and adjacent areas. Because of these very real differences in properties, it is apparent that the most efficient marketing of Douglas-fir will be attained if proper consideration is given to the area of growth.

Building Code Requirements: A report "Recommended Building Code Requirements for Wood or Wood-Base Materials," summarizes recent pertinent technical information and data for consideration by code-making bodies and others interested in code requirements relating to wood. The report is intended to serve as a draft of recommended requirements in building code form, which may be considered in whole or in part in connection with the development or revision of codes. It summarizes basic information on wood construction in a form useful to code-making bodies.



Glass Fiber as an Additive for Paper: Recent experiments on the addition of small amounts of glass fiber to pulp indicated promising possibilities for its use in a number of different grades of paper. The dimensional changes in a paper with changes in moisture content can be reduced as much as 50 percent by the addition of 5 percent of glass fiber to the pulp before the sheet is formed without any loss in bursting and tensile strength and with improved tearing resistance. Dimensional stability is important in printing papers, particularly for color printing, where accuracy of registration is essential.

Comparison of Conventional Groundwood and that Made from Chips of Ponderosa Pine and Douglas-fir: The possibility of making groundwood pulp from chips offers a new use for large quantities of mill residues that are not suitable for the conventional groundwood process because of their small size. Wood losses in sawing large-diameter logs to prepare them for conventional grinding would also be avoided. Experiments to compare conventional groundwood and that made by milling chips in an attrition mill showed the comparability of the pulps and brought out differences required in processing, as in bleaching. Newsprint, magazine coating-base stock, toweling paper, and medium-weight paperboard that contained the chip groundwood pulps were comparable in most properties to papers containing conventional groundwood.

Flame-Spread Tests of Hardwood Plywood: A builder in California has constructed several thousand houses in the peninsula south of San Francisco, lining the interior walls with 3-ply, 1/4 inch interior type imported lauan plywood. Several of these houses in Palo Alto and vicinity were set on fire by an arsonist and were gutted before the fire could be extinguished. The City of Palo Alto passed an ordinance forbidding the use of any wall lining material with a flame-spread index of 250 or more. This action caused considerable comment. The wood industry felt that wood was being penalized; the hardwood plywood industry feared that such an ordinance might be adopted by other communities, forcing hardwood plywood into an untenable position. At the request of the Fire Department of the City of Los Angeles, the Forest Products Laboratory tested in its newly developed small-tunnel furnace two specimens of the lauan plywood. The flame-spread index was found to be at a very safe level of 112 compared to flame-spread indices of 0 for noncombustible specimens and 100 for red oak flooring specimens. No evidence of unusual fire hazard was observed.

Navy Applies Forest Products Laboratory Data in Construction of Mine-Hunter: Launching of U.S.S. "Bittern," the Navy's first ship to utilize frames, keel, and other structural members laminated from preservative-treated wood, took place recently. No other wood hull has been so well protected from decay fungi through the extensive use of preservative-treated wood in such members as laminated frames and plywood bulkheads. Forest Products Laboratory technicians were frequently consulted before the building of this vessel began, and the

treated wood was laminated according to procedures developed at the Laboratory. Tests for the quality of glue joints on production samples cut from the laminated members were also carried out at the Laboratory. This was a cooperative project in which a portion of the costs was financed with funds provided by the Navy.

Natural Finish for House Siding: A durable natural finish that promises to retain the rich natural beauty of wood siding and trim has been developed by the Laboratory in response to a mounting demand from house owners for a durable and reliable natural finish. It was formulated to overcome the more serious shortcomings inherent in most natural finishes now available. The Laboratory's natural finish is essentially a modified stain and can be made by the house owner in a variety of red and brown colors that are especially suited for use on western red cedar and redwood siding. Test results so far indicate that the finish should last 4 years or more -- the average life of a good paint job -- before needing renewal.

Impreg with Improved Thermal Stability: A form of modified wood, impreg, shows promise for cost savings in shell molding of metal. In shell molding, the molten metal is poured into a thin sand-resin mold formed by casting a mixture of sand and resin around a hot pattern, the resin binder being set by high temperature. Metal patterns, generally used, are extremely high in cost -- too high for items of small production, as in aircraft. Forest Products Laboratory impreg has been shown to have the necessary thermal stability for use as patterns at considerably lower cost than for metal patterns. Recent preliminary work indicates that even greater thermal stability can be imparted to impreg if the wood is heat-treated before impregnation with resin.

Protecting Cooling Towers by Double Diffusion: A promising new method of treating wood with preservatives is the double diffusion process developed at the Forest Products Laboratory. This process is based on the formation of a highly toxic and permanent compound from the reaction between two chemicals that are applied separately to wood by simple methods. Although developed initially for use on farms and by small commercial plants, double diffusion has been widely adopted in the past two years to protect industrial cooling towers. These towers, which represent large investments in all parts of the country, are subject to deterioration by rotting organisms that greatly shorten their service life. To prolong the life of towers already built, more than 60 such structures, involving over 12 million feet of lumber, already have been treated by the double diffusion process. In this field of application alone, the action of the industries concerned indicates that savings of several millions of dollars are expected.

#### Forest Resources Research

Current Activities: This work includes the nationwide Forest Survey, research relating to the marketing of timber products, and investigations of the economics of timber production.



Forest Survey. The nationwide forest survey provides basic forest resource facts by States or counties on the character and condition of forest land; the volume, quality, and location of standing timber; rates of timber growth and natural losses; the amount and kind of timber cut for forest products; and consumption and prospective requirements for timber products. This information provides a basis for policies and action programs of public forestry agencies, forest industries, landowners, and many others having direct interests in forest resources.

Forest Products Marketing. Research in the marketing of forest products includes studies of possible means of increasing the efficiency of harvesting, grading, selling and distributing forest products, improved methods for providing price and market information for timber products, and development of expanded markets for timber species and materials in surplus supply. Such marketing investigations are of particular importance to the several million owners of farms and other small forest properties.

Other Economic Research. Investigations of the economic aspects of forestry enterprises provides information on the profitability of producing various timber crops in different areas, the effect of ownership, taxation, and other economic factors on the practice of forestry, and possible means of reducing financial and economic obstacles to the growing and harvesting of forest crops. These studies thus provide economic guidelines for forest owners and timber industries, and in conjunction with other resource investigations furnish part of the facts needed for development of national and local forestry programs.

#### Selected Examples of Recent Progress:

##### Forest Survey

Inventory completed on additional 38 million acres. Initial surveys were completed during 1957 on 10 million acres in seven States and coastal Alaska and 28 million acres more were resurveyed. About 510 million of the 648 million acres of forest land in the continental United States has been inventoried at least once. About four million of roughly 136 million acres of forest land in Alaska have been surveyed. Resurveys of the forest resources in each State are needed at 8 to 15 year intervals to determine changes in forest conditions and forestry problems and opportunities. Since World War II some 276 million acres have been covered by such resurveys, including the 28 million acres covered during the past fiscal year. Results of the Survey were released in numerous analytical and statistical reports; highlights of some are presented below.

Quality a problem in Massachusetts forests. The first comprehensive forest survey of Massachusetts revealed that this densely populated State is nearly two-thirds forested. The present timber cut is only about one-third of the annual growth of cubic-foot growing stock, in part reflecting the low quality of most of the timber resources. The report "The Timber Resource in Massachusetts" indicates ways in which timber management and marketing can be improved.



Forest resource improves in southeast Texas: In southeast Texas where forestry holdings are relatively large, forest areas, timber volumes and timber growth have increased significantly in the past 20 years despite major expansion of the pulp and paper industry in that area. In contrast, in northeast Texas where holdings are mainly small, stocking of both sawtimber and young growth has dropped as the result of heavy cutting, fires and overgrazing. The report "Forests of East Texas, 1953-55" points out ways in which public and private forestry efforts may reverse this unfavorable trend.

Forest Survey techniques improved: A new design for continuous reinventories is being developed in the Northeast, involving remeasurement of permanent ground plots supplemented by interpretation of photo plots on large-scale photography. It is expected that such new procedures will improve reinventory estimates of timber growth and volume while reducing cost and effort. Research in the use of aerial photos also has included comparisons of the effectiveness of different types of film and of large-scale photography for species identification and tree measurements. Photo volume tables were developed for various timber species in different regions, including interior Alaska where inaccessibility makes necessary maximum use of aerial survey methods.

#### Forest Products Marketing Research

Expanded markets sought for surplus species and low-quality timber. Possibilities for developing new or expanded markets for little-used species, low-quality timber, and unused wood residues were explored in several regions where such materials represent a surplus problem and a potential base for new forest industries. For example, a recent report "Industrial Opportunities - Headwaters Timber Development Unit" presents an economic analysis of such possibilities in a timber development unit of Idaho, Wyoming, and Utah where timber markets are relatively undeveloped. The report indicates the types of industrial development most feasible and desirable, the kinds and amounts of timber available, the best locations for new timber industries, and what type of development program will result in the best use of the timber resource.

Charcoal production in 1956 exceeded one-fourth million tons. A nationwide survey of the charcoal industry was conducted in response to numerous requests from the industry and other interested groups. Charcoal marketings in 1956 totaled 265 thousand tons. This was somewhat higher than in 1955 and other postwar years, but less than half of the all-time peak of 555 thousand tons in 1909. A report "Charcoal Production in the United States" presents information regarding regional distribution of plants; volume, form, species and costs of wood consumed; number of kilns by type; and market outlets for charcoal.

### Other Economics Research

Forest product price data analyzed: In response to a section of the Agricultural Act of 1956, a report on "Price Trends and Relationships for Forest Products" was prepared and forwarded to the Congress. This report presented information to illustrate the kind of price information available for stumpage, logs, lumber, pulpwood and other forest products, the adequacy of existing price information, and ways in which the accuracy and usefulness of price information might be increased.

Economic guides developed for maximizing net returns from timber: A comprehensive project on the economic aspects of timber growing conducted in the South resulted in publication of a technical bulletin on, "Financial Maturity: A Guide to Profitable Timber Growing." This outlines procedures and practical guides for evaluating timber harvesting alternatives designed to maximize net income of a forest business. The financial maturity principle provides a means for deciding which trees to cut and which to leave. If properly adapted, it can be applied to any species, silvicultural system, or combination of products.

State forest tax law digest revised: A new edition of the "State Forest Tax Law Digest" was issued, the first since 1945. This provides a non-technical summary of 44 tax laws which are in effect in 31 States and territories. Included for the first time are forest severance taxes and a selected list of studies relating to State and local taxation of forest properties.



## STATE AND PRIVATE FORESTRY COOPERATION

Current Activities: This program, for the most part carried on in cooperation with the States, encourages private timber growing through assistance in preventing and suppressing forest fires, reforestation of denuded and poorly stocked areas, and good management of woodlands. Privately owned forest lands comprise three-fourths of the Nation's commercial forest area and produce 90 percent of all timber cut. The fire control program applies to all forest lands within the boundaries of organized protection units. The balance of the program is concentrated on small forest properties in private ownership because (a) more than half of the commercial forest acreage is in small holdings averaging only about 60 acres each, (b) the small-owner group comprises 99 percent of private forest owners, and (c) present cutting practices are poorest on these small properties.

### Recent Progress and Trends:

#### 1. Cooperation in forest fire control:

Progress has been continued by reducing the unprotected area by another 2.8 million acres during 1956. This is in contrast with the 4.8 million in 1955 and the average of about 6 million per year for the past 20 years. The reduction of the unprotected area is our most important problem. In 1956, 11.3 percent of the unprotected area burned, compared to .4 percent burn on protected areas. This burn of unprotected forests and non-forested watersheds is at a rate of 28 times greater than that of protected areas. The number of fires was reduced 4-1/2 percent from 1955 and the area burned over was reduced by 16 percent.

Other examples of recent cooperative progress:

- (a) Completion of the State by State review showing the area in need of protection as 435 million acres and the cost of protection estimated as a total of 83.5 million dollars per year.
- (b) The State and Private forestry work in the Southwest and intermountain regions was reorganized to provide more effective administration of the cooperative programs in New Mexico, Nevada, Utah, and south Idaho.
- (c) Special technical services were given to the States in equipment development and procurement, training programs, and fire weather research.
- (d) Assistance and technical guidance was provided the States in the development of plans for Rural Fire Defense.



The following table shows State allotments and expenditures for cooperation in forest fire control:

	State and Private:	Federal
	Funds Expended,	Allotments
	F.Y. 1957	F.Y. 1958 <sup>1/</sup>
Alabama .....	\$ 800,841	\$ 364,100
Arkansas .....	839,675	278,900
California .....	8,151,776	1,272,900
Colorado .....	72,952	30,000
Connecticut .....	186,347	44,200
Delaware .....	12,703	13,500
Florida .....	1,960,727	605,400
Georgia .....	2,475,825	551,800
Hawaii .....	14,128	10,000
Idaho .....	328,505	131,500
Illinois .....	109,685	34,100
Indiana .....	127,064	51,800
Iowa .....	29,051	30,000
Kentucky .....	397,134	113,500
Louisiana .....	1,365,453	346,500
Maine .....	743,183	214,500
Maryland .....	420,387	100,800
Massachusetts .....	343,650	121,100
Michigan .....	1,965,654	444,300
Minnesota .....	600,955	287,400
Mississippi .....	1,261,232	305,600
Missouri .....	561,259	196,300
Montana .....	277,071	81,700
Nevada .....	80,869	30,000
New Hampshire .....	236,991	63,100
New Jersey .....	329,179	94,300
New Mexico .....	21,390	30,000
New York .....	890,834	229,500
North Carolina .....	976,100	321,700
North Dakota .....	2,001	4,000
Ohio .....	241,623	68,900
Oklahoma .....	218,407	89,200
Oregon .....	2,147,413	581,600
Pennsylvania .....	522,631	175,600
Rhode Island .....	90,445	33,800
South Carolina .....	996,843	278,900
South Dakota .....	38,091	30,000
Tennessee .....	741,599	207,700
Texas .....	668,541	223,100
Utah .....	96,671	30,000
Vermont .....	54,018	30,000
Virginia .....	794,162	231,000
Washington .....	2,148,243	587,300
West Virginia .....	251,483	127,100
Wisconsin .....	1,358,063	343,300
Administration, Inspection, Prevention, and Special Services to States .....	---	603,000
Grand Totals .....	35,950,854	10,043,000

<sup>1/</sup> While the amount available to a State may, if the allotment is small, exceed previous expenditures by that State, the actual payment to a State never exceeds State and private funds expended by or under the control of the State.

2. Cooperation in forest tree planting:

The program to furnish tree planting stock to state and private landowners advanced at a record rate last year. In fiscal year 1956 the program output was 560 million plants--a fourfold increase in 6 years. This record production is the result of enormous expansion in the state nurseries--especially in the South--and the expansion continues to such an extent that an annual output of more than one billion plants is forecast within 2 or 3 years. The State of Kansas joined the program during the year (thus bringing the total to 45 States plus Hawaii and Puerto Rico), and steps have been taken preparatory to Nevada coming into the program shortly. The amount of production in the state nurseries for the program under this appropriation and from other Federal programs is contrasted with the production in commercial and forest industry nurseries on Chart II.

The Federal share of the financing for this program in fiscal year 1956 was \$500,000, but this was raised to \$1,000,000 for 1957. This is the first significant increase since 1951. The contributions of the States and the private landowners have almost quadrupled in the same period and now exceed \$4-1/4 million.

In spite of increasing wages paid nursery laborers, the production costs for the program's trees are being held down by the combination of the economies resulting from mass production and the development of new techniques. In 1956 the cost was \$8.51 per thousand trees, which is the second lowest cost of record, 58¢ below the 5-year average. The average posted sale price was \$4.81 per thousand.

3. Cooperative Forest Management and Processing:

In fiscal year 1957 Kansas, Nebraska, and Nevada entered the cooperative program. Farmers and other small owners now are receiving technical forest management assistance in some 1,400 counties in 44 States and Puerto Rico. About 1,000 counties with small woodlands, however, are still without this service.

The number of "service" or "farm foresters" increased from 285 in 1956 to around 300 in 1957. The 285 foresters assisted 38,121 small owners to do better management on 3,124,744 acres of woodland. These owners received \$14,757,555 from the sale of over 625 million board feet of forest products harvested. In addition, 310,000 acres of young timber were saved from premature harvest. In 1956 over 6,400 small processors of forest products were assisted.

This cooperative program continued to strengthen the private forestry profession by referring 689 woodland owners, with about 420,000 acres, to private consulting foresters who charged a fee for their technical services.



The Federal Government's share in this cooperative endeavor aimed at 4-1/2 million small owners and some 50,000 small forest products processors, was \$682,429 in fiscal year 1956. The States spent an additional \$1,432,199. In 1957 the Federal share was raised to \$1,000,000--the first increase since 1950--and the States are increasing their contributions.

4. General Forestry Assistance:

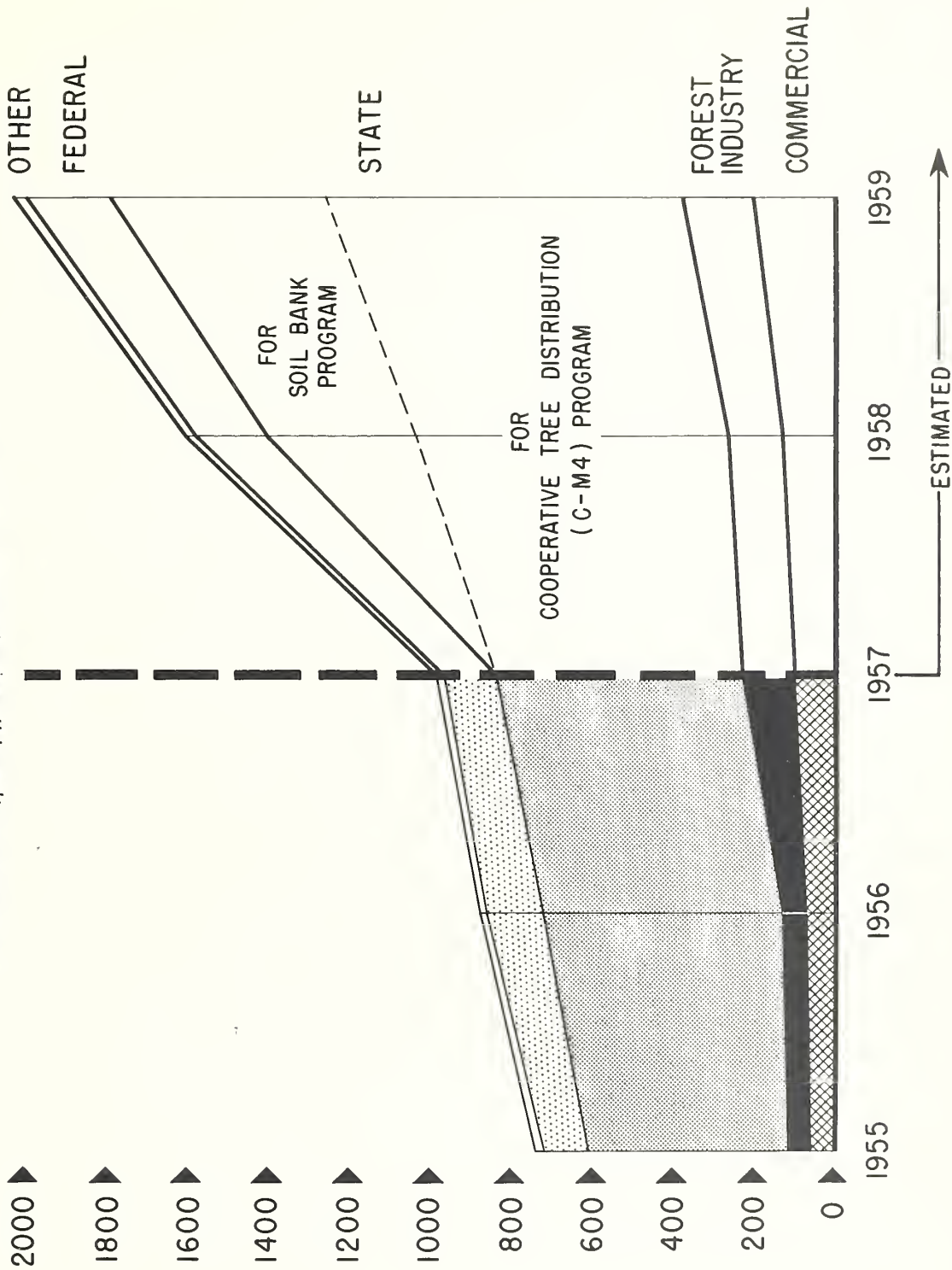
The Forest Service continued to provide technical forest management assistance to other Federal, State, community, and private agencies and to the Congress, forest industries, colleges, forest consultants, and landowners. Some of this assistance is in highly specialized management and inventory problems and is provided by a few specialists working out of Forest Service regional offices and in close coordination with the state foresters. Particular attention is given to the 27 States in which there are large areas of "rural underemployment." New forest industries are being encouraged in rural areas which have a surplus of both farm labor and timber volumes. For example, in October 1956, in a 17-county area in Kentucky, a study was made of the possibilities of marketing 65 million board feet of sawtimber and 500,000 cords of pole timber available annually for new and expanded industrial utilization. The Kentucky Bankers' Association published the study and a plane load of bankers flew up to the Forest Products Laboratory at Madison, Wisconsin to investigate the possibilities of timber utilization.

Other examples of recent cooperative management progress are: (1) hardwood utilization schools were held in the South to give state, industrial, and consultant foresters and forest school professors information on the latest techniques of log grading, utilization, and forest management; (2) large landowners, particularly in the Lake States and South, were given technical assistance in the application of newly developed "continuous forest inventory" techniques using cards marked in the forest but read and tabulated by automatic machines; and (3) Purdue University was assisted in setting up a graduate course in the continuous forest inventory technique.



CHART II

# Tree Planting Stock Production (Millions)





(b) Forest Roads and Trails

	Forest Roads and Trails (Annual Appropriation)	Roads and Trails for States (Permanent Appropriation)	Total
Appropriation Act, 1958, and base for 1959 .....	\$24,336,000	\$10,788,500	\$35,124,500
Budget Estimate, 1959 .....	<u>23,099,000</u>	<u>10,788,500</u>	<u>33,887,500</u>
Decrease .....	<u>-1,237,000</u>	<u>- -</u>	<u>-1,237,000</u>

Note: The above tabulation and the following project schedule and justification combine the appropriation for "Forest roads and trails" made pursuant to the Federal-Aid Highway Act of 1923, as amended, and the appropriation of 10 percent of forest receipts for construction and maintenance of roads and trails within the national forests, pursuant to 16 U.S.C. 501.

\* \* \* \* \*

Although a decrease of \$1,237,000 in the appropriation is proposed for 1959, it is estimated there will be a decrease of only \$362,864 in obligations for construction and maintenance of roads and trails because of the availability in 1959 of \$350,000 carried forward from the fiscal year 1958.

PROJECT STATEMENT  
(On basis of available funds)

Project	1957	1958 (estimated)	Increase or Decrease	1959 (estimated)
1. Construction of roads and trails .....	\$25,350,655	\$24,714,764	+\$22,736	\$24,737,500
2. Maintenance of roads and trails .....	10,215,844	10,385,600	-335,600	10,000,000
Total obligations .....	35,566,499	35,100,364	-362,864(1)	34,737,500
Unobligated balance brought forward .....	-993,717	-825,864	-24,136	-850,000
Unobligated balance carried forward .....	+825,864	+850,000	-850,000	- -
Transfer from "Roads and trails for States" (transfer shown in 1957 for comparability) .....	-11,398,646	-10,788,500	- -	-10,788,500
Total appropriation or estimate .....	24,000,000	24,336,000	-1,237,000	23,099,000



DECREASE

(1) A net decrease of \$362,864 in available funds for construction and maintenance of forest roads and trails is proposed. In the fiscal year 1958 it was necessary to repair and restore roads and trails damaged by floods and storms during the winter of 1955-56, mostly in California, Idaho and Oregon. This work will be completed in 1958.

\* \* \* \* \*

The following table summarizes the total road and trail program for the fiscal years 1957, 1958, and 1959:

Program for Roads and Trails

Item	: 1957 :Obligations:	: 1958 : Estimate	: 1959 : Estimate	: Incr. or Decr. :1959 Approp. : compared : with 1958 :Appropriation
<u>CONSTRUCTION</u>				
Bridge replacement .....	\$3,346,156	\$3,380,000	\$3,380,000	- -
Fire and general purpose roads and trails .....	3,132,927	3,617,834	3,460,500	-157,334
Timber access roads .....	18,871,572	17,716,930	17,897,000	+180,070
Subtotal, Construction ...	25,350,655	24,714,764	24,737,500	+22,736
<u>MAINTENANCE</u>				
Roads and trails .....	10,215,844	10,385,600	10,000,000	-385,600
Total direct obligations, Construction and Maintenance .....	35,566,499	35,100,364	34,737,500	-362,864
Prior year balance brought forward .....	-993,717	-825,864	-850,000	-24,136
Balance available in subsequent year .....	825,864	850,000	- -	-850,000
Appropriation or estimate .....	35,398,646	35,124,500	33,887,500	-1,237,000

# STATUS OF PROGRAM

The national forests must be made accessible before they can be fully developed; losses from fire, insects, disease, and soil erosion minimized; lands managed for optimum production of water, timber, forage, wildlife, and recreation benefits; and resources utilized for maximum economic return. As currently estimated a forest development transportation system comprised of 167,200 miles of roads and 121,500 miles of supplemental trails is needed to make the forests accessible. The status of this system is as follows:

	<u>Miles (Estimated)</u>	
	<u>Roads</u>	<u>Trails</u>
Existing facilities on which stage of improvement is adequate for present use .....	72,500	91,400
Existing facilities on which stage of improvement is inadequate for present use .....	51,900	24,600
Planned (nonexisting) facilities estimated to be needed within the next 20 years .....	<u>42,800</u>	<u>5,500</u>
Total system - existing and planned .....	<u>167,200</u>	<u>121,500</u>

During the fiscal year 1957 the following improvements on the forest development transportation system were accomplished:

<u>By the Government:</u>	<u>Units of Work Completed</u>	<u>Obligations</u>
<u>Item</u>	<u>(Actual)</u>	<u>(Actual)</u>
Roads constructed and reconstructed:		
For timber access .....	854.8 Mi.	\$15,556,189
For all-purpose access .....	278.8 Mi.	2,662,421
Trails constructed and reconstructed .....	115.9 Mi.	428,082
Bridges constructed and reconstructed .....	555 Ea.	5,465,082
Engineering and supplementary construction on timber access roads constructed by timber purchasers .....	xxx	<u>1,238,881</u>
Total obligations by Government .....		<u>25,350,655</u>

<u>By Timber Purchasers:</u>	<u>Units of Work</u>	<u>Appraised Value</u>
<u>Item</u>	<u>Completed</u>	<u>of Work</u>
	<u>(Actual)</u>	<u>(Estimated)</u>
Timber access roads constructed and reconstructed .....	2,725.8 Mi.	\$29,252,799
Bridges constructed and reconstructed ...	35 Ea.	<u>227,211</u>
Total appraised value of purchaser work	xxx	<u>29,480,010</u>

The existing forest development transportation system is maintained in part by the Forest Service and in part by others, such as local public road authorities, private cooperators and permittees, and purchasers of national forest timber. The following table shows how the system was maintained in fiscal year 1957. During that year \$8,342,430 was obligated for work on the roads maintained by the Forest Service and \$1,873,414 for work on the trails.

	<u>Miles (Estimated)</u>	
	<u>Roads</u>	<u>Trails</u>
Facilities maintained by Forest Service ....	75,300	114,500
Facilities maintained by others .....	45,100	1,500
Inactive facilities not maintained .....	<u>4,000</u>	<u>- -</u>
Total existing system .....	<u>124,400</u>	<u>116,000</u>



(c) Acquisition of Lands for Cache National Forest

	Acquisition of Lands for National Forests, Special Acts	Acquisition of Lands for Cache National Forest	Total
Appropriation Act, 1958, and base for 1959.....	\$10,000	\$50,000	\$60,000
Budget Estimate, 1959 .....	<u>10,000</u>	<u>50,000</u>	<u>60,000</u>

PROJECT STATEMENT

Project	1957	1958 (estimated)	1959 (estimated)
Acquisition of Lands for Cache National Forest .....	\$56,391	\$63,416	\$60,000
Unobligated balance brought forward ..	- -	-3,416	- -
Unobligated balance carried forward ..	3,416	- -	- -
Total appropriation or estimate .....	59,807	60,000	60,000

STATUS OF PROGRAM

Two appropriations are available for acquisition of lands for Cache National Forest. A \$10,000 appropriation is available from national forest receipts when appropriated by Congress. The \$50,000 appropriation is based on the Act of July 24, 1956 (70 Stat. 632) which authorized additional appropriations for the same purpose. Funds appropriated under the latter act must be matched by donation of land or funds of not less than equal value contributed by local agencies or persons. These contributions include costs of lands previously donated to the United States by local agencies or groups and national forest receipts used to purchase land which otherwise would have accrued to the benefit of the local counties, to the extent that these exceed contributions by the Federal Government. Review of past records indicates that the local contribution in accordance with the Act, through fiscal year 1955, is about \$100,000; a final examination of local records is now in progress. Thus, there was sufficient credit available to meet substantially the non-federal cost share for 1957 and 1958. Additional matching is anticipated.

These funds are used to acquire lands within the Cache National Forest, Utah, which are critical from watershed and erosion standpoints to enable control and minimization of soil erosion and flood damage. These lands are in a depleted condition watershed-wise, and are flood and erosion hazards. Public ownership is required to restore such lands and assure against further depletion. In fiscal year 1957, 7,429 acres of these important watershed tracts were approved for purchase.

In 1958, it is planned to acquire with appropriated funds an additional 6,000-7,000 acres of these lands within the North Fork Ogden River drainage, the North Ogden watershed, and the Wellsville Mountain watershed area.



(d) Acquisition of Lands for Superior National Forest

Appropriation, 1958 and base for 1959 .....	\$500,000
Budget Estimate, 1959 .....	<u>300,000</u>
Decrease (to provide for acquisition of lands at about the 1958 level) .....	<u>-200,000</u>

PROJECT STATEMENT

Project	1957	1958 (estimated)	Increase (+): or Decrease (-)	1959 (estimated)
Acquisition of lands for Superior National Forest ...	\$273,590	\$568,090	-68,090	\$500,000
Unobligated balance brought forward .....	-41,680	-268,090	+68,090	-200,000
Unobligated balance carried forward .....	268,090	200,000	-200,000	- -
Appropriation or estimate ....	500,000	500,000	-200,000(1)	300,000

DECREASE

(1) The proposed decrease in appropriation of \$200,000 is offset by a carry-over of an equivalent amount from fiscal year 1958 which will permit a program in the fiscal year 1959 at approximately the same level as in the fiscal year 1958.

STATUS OF PROGRAM

This appropriation is for the purchase of land pursuant to the Act of June 22, 1948 (62 Stat. 568), as amended by the Act of June 22, 1956 (70 Stat. 326), to preserve the unique qualities of the remaining wilderness canoe area in the Superior National Forest, Minnesota. The Act of June 22, 1956, extended the area to which the purchase directive applies and authorized additional appropriations.

During the fiscal year 1957, 32 tracts containing 2,741 acres, costing \$266,679, were approved for purchase. These included several resort and other improved tracts the existence of which materially impaired the unique quality of this remaining wilderness canoeing area. Acreage acquired in the area to which this law is applicable from June 1948 to date, through purchase and exchange, is 19,597 acres.

Within the area authorized for purchase there are still to be acquired 24 properties improved and used for commercial resort purposes, 66 properties with other improvements (mostly cabins), and 36,700 acres of private lands not yet developed. An appropriation of \$500,000 in fiscal year 1958 provides for the purchase of about one-quarter of these properties. Emphasis will be placed on acquisition of improved tracts and tracts which because of location or character may be improved in the near future, as such tracts most seriously detract from or threaten the distinctive qualities of the canoeing area.



(e) Cooperative Range Improvements

Appropriation Act, 1958, and Base for 1959 .....	\$700,000
Budget Estimate, 1959 .....	<u>700,000</u>

The appropriation made from national forest receipts pursuant to section 12 of the Act of April 24, 1950, is transferred to and merged with the appropriation "Forest Land Management." For comparability, the amounts obligated for this purpose in 1957 are also reflected in the Project Statement for "Forest Land Management."

(f) Assistance to States for Tree Planting

Appropriation Act, 1958 and base for 1959 .....	\$500,000
Budget Estimate, 1959 .....	- -
Decrease (to eliminate the appropriation for this program in 1959) .....	<u>-500,000</u>

PROJECT STATEMENT

Project	:	1957	:	1958	:	1959
	:		:	(estimated):	:	(estimated)
Tree planting (appropriation	:		:		:	
or estimate) .....	:	- -	:	\$500,000:-\$500,000(1):	:	- -

DECREASE

(1) Decrease to eliminate the appropriation for this program in 1959.

It is proposed to defer further appropriations for this program, which was initiated in 1958. Through January 1958, agreements have been approved for the advance of funds to only eight States on the basis of plans submitted by the States. These States are Florida, Georgia, Maine, Michigan, Minnesota, New Hampshire, Pennsylvania, and Rhode Island. Other assistance to land owners in tree planting through existing programs of the Department and the States should make it possible for the States to continue effective reforestation programs.

The approved State plans for 1958, in addition to direct tree planting, provide for land preparation and purchase of planting equipment and thus will contribute to an effective program in 1958 as well as providing for continued reforestation programming by the States even though Federal funds under this program are not available during fiscal year 1959.

CHANGE IN LANGUAGE

The estimates propose deletion of language for this item as follows:

[For expenses necessary to carry out section 401 of the Agricultural Act of 1956, approved May 28, 1956 (70 Stat. 188), \$500,000, to remain available until expended.]

This language change deletes the appropriation in its entirety since no estimate for this item is proposed in the 1959 budget.





## GENERAL PROVISIONS

### CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

- Sec. 201. Appropriations available to the Forest Service for the current fiscal year shall be available for: (a) purchase of not to
- 1 exceed [157] 120 passenger motor vehicles [, of which 132 shall be] for replacement only, and hire of such vehicles; operation and maintenance of aircraft and the purchase of not to exceed [five]
  - 2 six, of which four shall be for replacement only; \* \* \* (e) purchase, erection, and alteration of buildings and other public improvements, but the cost of any such building, exclusive of the cost of constructing a water-supply or sanitary system and of connecting the same with any such building, and exclusive of any tower upon which a lookout house may be erected, shall not exceed \$25,000 (\$30,000 in
  - 3 Alaska), except for one building which shall not exceed \$80,000: Provided, That one building may be constructed to serve the purposes of two or more buildings at a cost not to exceed the sum of the limitations for separate buildings: Provided further, That any building, the cost of which as improved was \$25,000 or more, shall not be improved within any fiscal year by an amount in excess of 5 per centum of such cost (5 U.S.C. 565a) except that an additional
  - 4 \$400,000 may be used for improvements at the Forest Products Laboratory; \* \* \*

### EXPLANATION OF CHANGES IN LANGUAGE

The first and second changes in language would provide authority for the Forest Service to replace 120 passenger motor vehicles and to purchase six aircraft, of which four would be acquired to replace existing aircraft. A complete justification for the need for these vehicles appears in the justification of estimates for motor vehicles and aircraft.

The third change would authorize construction of an aerial operations loft building at McCall, Idaho, estimated to cost \$80,000.

A smokejumper base was established at McCall, Idaho in 1943 with limited facilities and 10 smokejumpers. The present loft was assembled in 1944 from parts of portable Civilian Conservation Corps buildings. It has now deteriorated beyond repair and does not have sufficient space to provide for production line flow of work essential for maximum use of the aerial resources. The jumper force has been expanded to 70 and should be increased to 80 within the next two years. A building 50' x 100' with parachute loft (tower) is needed to provide for the care, maintenance, repair, and packing of parachutes used by smokejumpers operating from this base, in addition to 1,000 aerial cargo parachutes which are serviced here annually.

McCall, Idaho is the base of aerial operations for the large roadless areas of central Idaho timber and watershed lands comprising 18,000,000 acres of national forest lands lying within three Forest Service regions and seven national forests. An annual average of 520 lightning fires per year occur in this operating area, of which one-fifth are initially attacked by aerial forces operating from this base.

The fourth change would authorize the use of \$400,000 for replacement of the existing unsafe and worn-out steam plant at the Forest Products Laboratory, Madison, Wisconsin. It is proposed to install a modern steam plant of larger capacity including required housing, appurtenances, and connection to the present steam system.

The boilers of the present steam plant have become unsafe. A recent boiler inspection indicated that the 23-year-old steam generators may have to be operated at reduced pressure. This would seriously handicap operations. If the boilers fail the Laboratory would have to close for an extended period until emergency steam generation devices could be installed.

In still another respect the present steam plant is a hazard to the safety and health of the operators. It is located about 20 feet below ground level and lacks natural ventilation. Occasionally gases from the adjoining pulp and paper and wood preservation laboratories enter the sump. Even small quantities of these gases, which may include poisonous chlorine from bleaching, cause great discomfort and danger to the operators. The operators in the boiler room have to mount two flights of stairs to gain access to the open. This is a dangerous situation in case of emergency.

Moreover, the present plant is insufficient in capacity to meet existing steam demands. On occasions it must be operated at 100 percent in excess of rated capacity to meet current needs. Even at these dangerous levels of operation steam use must be carefully rationed during the winter months because of heating requirements. Lessened efficiency of operation of the Laboratory results. The modern steam plant proposed will increase capacity from 14,000 pounds of steam to approximately 45,000.



(g) Expenses, Brush Disposal

Appropriation, 1958 and base for 1959 .....	\$4,500,000
Budget Estimate, 1959 .....	<u>4,500,000</u>

PROJECT STATEMENT

Project	1957	1958 :(estimated):	1959 :(estimated)
Brush disposal .....	\$4,147,244	\$4,960,000	\$4,960,000
Unobligated balance brought forward .....	-2,031,578	-2,675,520	-2,215,520
Repayment from "Salaries and expenses, Fighting forest fires" for obligations incurred in 1956 .....	-1,917,974	- -	- -
Unobligated balance carried forward .....	2,675,520	2,215,520	1,755,520
Total appropriation or estimate .....	2,873,212	4,500,000	4,500,000

STATUS OF PROGRAM

Timber cutting and removal creates slash, debris, or brush which may in turn materially increase the fire hazard. Prior to the sale of national forest timber, consideration must be given to treatment of these fuel accumulations to avoid creating large continuous areas of high risk slash fuels. Because of this factor, national forest timber sale contracts require treatment of the debris resulting from cutting operations to the degree necessary to reduce the fire hazard to a point near normal. Depending on circumstances, the work may be performed either by the timber purchaser or by the Government. The Brush Disposal appropriation represents deposits by the timber purchaser to cover costs of the work when it is performed by the Government as authorized under section 6 of the Act of April 24, 1950 (16 U.S.C. 490).

There is a wide variation between Regions in the effect that cutting of timber has on fire hazard, and consequently the manner in which debris is treated. In the three eastern Regions, the volume cut per acre is relatively low, utilization is close, and the general humid atmospheric conditions result in rapid decomposition of debris. Very little special slash disposal work is done on sale areas in these three Regions, the exception being in some of the sales in the pine type where a heavier cut per acre is often made, such as the jack pine stands of Minnesota. In contrast to the light slash disposal requirements in the eastern Regions, the cost of slash abatement on most sale areas of the western Regions is high. Treatment of the slash is essential if serious and catastrophic fires are to be prevented. The type of treatment varies considerably due to different methods of cutting. For instance, clear cut areas in the Douglas-fir region are broadcast burned. In selectively cut areas the debris may be piled for burning and this may be done over the whole area or only in strips which break the area up into blocks.

In the western Regions purchasers are required to perform slash disposal on some sales or to perform certain phases of the work which they can do more efficiently with their crews and equipment while actively engaged in other phases of the operation. While slash disposal follows general prescriptions within regions, the individual needs of each sale offering are planned and appraised prior to advertisement and appropriate specific requirements are



incorporated into each timber sale contract. In each instance the least expensive method or combination of methods is used which will attain adequate protection of the area. In some instances adequate protection from fire is attained at less cost by providing additional protection for sale areas until the slash hazard reverts to near normal. Greater intensity of fire protection for several years may be less costly than complete slash disposal immediately after cutting. In such cases Brush Disposal funds are used in providing the needed man-power and facilities.

(h) Roads and Trails for States, National Forests Fund

Appropriation, 1958, and base for 1959 .....	\$10,788,500
Budget Estimate, 1959 .....	<u>10,788,500</u>

The permanent appropriation of 10 percent of national forest receipts pursuant to the Act of March 4, 1913 (16 U.S.C. 501) is transferred to and merged with the annual appropriation for "Forest Roads and Trails." The Project Statement for "Forest Roads and Trails" reflects, for comparability, the amounts obligated under this permanent appropriation for the fiscal year 1957.

(i) Forest Fire Prevention

Appropriation, 1958 and base for 1959 .....	\$15,000
Budget Estimate, 1959 .....	<u>15,000</u>

PROJECT STATEMENT

Project	1957	1958 :(estimated):	1959 :(estimated)
Forest fire prevention .....	\$19,472:	\$19,825:	\$15,000
Unobligated balance brought forward .....	-8,712:	-4,825:	- -
Unobligated balance carried forward .....	4,825:	- -	- -
Appropriation or estimate .....	15,585:	15,000:	15,000

STATUS OF PROGRAM

Current Activities: The Smokey Bear licensing program officially known as the Commercial (Fire) Support Educational Program is an important part of the Cooperative Forest Fire Prevention Campaign and it has now been in effect since 1952. The Campaign itself has been conducted for 15 consecutive years as a cooperative project of the State Foresters and the Forest Service, United States Department of Agriculture, and is a public service program of the Advertising Council. The purpose of this campaign is to utilize the free public service resources of the various national advertising channels such as car cards, poster display systems, radio and television networks and magazine and newspaper allocation plans in developing public cooperation in the prevention of man-caused forest fires. Since 1945 this campaign has been built around Smokey Bear, who has become recognized and accepted by the public as a nationwide symbol of forest fire prevention.

Under authorization of Public Law 359 of the 82nd Congress, the Secretary of Agriculture has issued rules and regulations governing the licensing program. These licenses specify payment of royalties (usually 5%) and set up certain controls for administering the program and collecting the royalties including advance deposits to protect the Government's interest. Through the sale and distribution of the various products Smokey has become a welcome visitor in more homes each year.

Selected Examples of Recent Progress:

1. Since the Cooperative Forest Fire Prevention Campaign started in 1942, number of fires has been reduced from an average of 210,000 in 1942 to 143,485 in 1956.
2. Since 1952 the "Smokey" Commercial Support Educational Program has yielded over \$122,000 in royalties from sales of these items.
3. A new Smokey Bear comic strip was released to newspapers across the country on June 16, 1957. To date these Sunday and daily strips are being purchased by 59 major newspapers with a reader circulation estimated at 25 million persons. The list of newspapers is growing and now includes one major Canadian paper.



4. In response to individual and small group requests to become members of Smokey's Junior Forest Rangers 500,000 Junior Forest Ranger Kits were sent out during 1956. Because of the newspaper promotion of the new comic strip this number may reach one million in 1957.

Smokey Bear has a strong influence on the boys and girls of the country. He averages 1,000 letters and cards a day and over 4,500 pieces of mail addressed to Smokey have been received in a single day. Although most of the mail comes from children, it is interesting to note that many letters are received from parents telling about the effect which Smokey is having on their children and how in turn the children are insisting that their parents and other grownups follow fire safety practices not only in the forest but in the home as well.

(j) Payment to Minnesota (Cook, Lake, and St. Louis Counties)  
from the National Forests Fund

Appropriation, 1958 and base for 1959 ..... \$48,000  
Budget Estimate, 1959 ..... 48,000

PROJECT STATEMENT

Project	1957	1958 :(estimated):	1959 :(estimated):
Payment to Minnesota (appropriation or estimate) .....	\$46,497:	\$48,000:	\$48,000

STATUS OF PROGRAM

Section 5 of Public Law 733, 80th Congress, approved June 22, 1948, provides that the Secretary of the Treasury, upon certification of the Secretary of Agriculture, shall pay to the State of Minnesota at the close of each fiscal year an amount equivalent to three-fourths of one percent of the fair appraised value of certain national forest lands in the counties of Cook, Lake, and St. Louis situated within the Superior National Forest. The Act further provides that payment to the State shall be distributed to each of these counties in conformity with the fair appraised value of such national forest lands in each county.

(k) Payments Due Counties, Submarginal Land Program,  
Farm Tenant Act (Permanent Appropriation)

Appropriation, 1958 and base for 1959 .....	\$425,000
Budget Estimate, 1959 .....	<u>425,000</u>

PROJECT STATEMENT

Project	:	1957	:	1958	:	1959
	:		:	(estimated)	:	(estimated)
Payments due counties (Appropriation	:		:		:	
or estimate) .....	:	\$490,565	:	\$425,000	:	\$425,000

STATUS OF PROGRAM

At the end of each calendar year, 25 percent of the revenues from the use of submarginal lands are paid to counties under the provisions of Title III of the Bankhead-Jones Farm Tenant Act, approved July 22, 1937 (50 Stat. 526).



(1) Payments to School Funds, Arizona and New Mexico,  
Act of June 20, 1910

Appropriation, 1958 and base for 1959 .....	\$129,400
Budget Estimate, 1959 .....	<u>129,400</u>

PROJECT STATEMENT

Project	1957	1958 :(estimated):	1959 :(estimated):
Payments to school funds (appropriation or estimate) .....	\$129,404:	\$129,400:	\$129,400

STATUS OF PROGRAM

Under provisions of the Act of June 20, 1910 (36 Stat. 562, 573) certain areas within national forests were granted to the States for school purposes. The percentage that these lands are of the total national forest area within the State is used in determining payments to the States. The receipts from all national forest land within the State are used as the basis for applying the percentage. For example, if total receipts for the State are \$100,000 and if ten percent of lands are in the "granted for school purposes" category, the payment to the State would be \$10,000. The amounts so paid are deducted from the net receipts before computing the 25 percent payments to States.

As soon after the close of the fiscal year as the receipts from national forests and the area of school lands in the States of Arizona and New Mexico are determined, the payments are made to the States. Estimated payments in fiscal year 1958 to Arizona will be \$128,520 and to New Mexico \$880.

(m) Payments to States and Territories from the  
National Forests Fund

Appropriation, 1958 and base for 1959 .....	\$26,969,200
Budget Estimate, 1959 .....	<u>26,969,200</u>

PROJECT STATEMENT

Project	1957	1958 (estimated)	1959 (estimated)
Payments to States and Territories (appropriation or estimate) .....	\$28,490,343	\$26,969,200	\$26,969,200

STATUS OF PROGRAM

The Acts of May 23, 1908, and March 1, 1911, as amended by the Act of June 30, 1914, require, with a few exceptions, that 25 percent of all money received from the national forests during any fiscal year be paid to the States and Territories in which the forests are located, for the benefit of public schools and public roads of the county or counties in which such national forests are situated. The amount of this appropriation varies each year in direct proportion to national forest receipts during the previous fiscal year.

The amounts set aside from receipts collected for the sale of national forest timber, grazing and special use permits, etc., before the 25 percent is applied, are listed below:

1. Payment to the State of Minnesota covering certain national forest lands in the Counties of Cook, Lake, and St. Louis situated within the Superior National Forest, is made under the terms of the Act of June 22, 1948, Public Law 733. Receipts collected from the areas covered by this Act are excluded when the 25 percent payment to the State of Minnesota is computed.
2. For lands in certain counties in Utah, Nevada, and California, the States receive 25 percent of receipts only after funds, if made available by Congress, have been set aside for the acquisition of national forest lands within the specified national forests under the terms of special acts authorizing appropriations from forest receipts for this purpose.
3. Payments to the States of Arizona and New Mexico under the provisions of the Act of June 20, 1910, of shares of the gross receipts from the national forests in those States which are proportionate to the areas of land granted to the States for school purposes within the national forests.

(n) Development and Improvement of a Ranger Dwelling,  
Tonto National Forest

PROJECT STATEMENT

Project	1957	1958 (estimated)	1959 (estimated)
Unobligated balance brought forward .....	-\$645:	- -:	- -
Unobligated balance no longer available ..	645:	- -:	- -
Appropriation or estimate .....	- -:	- -:	- -



(o) Working Capital Fund

This fund is available, without fiscal year limitation, for financing, on a reimbursable basis or by advance payments in connection with firm orders, various services such as repairing and replacing equipment, stocking and issuing supplies, and operation of photographic and reproduction facilities in support of programs of the Forest Service. These service operations serve concurrently the programs of fire protection, timber utilization, construction and maintenance of roads and other improvements, reforestation, grazing, watershed, forest and forest products research, and kindred conservation activities of the Forest Service, including cooperative assistance with other Federal agencies, States, counties, farmers, forest landowners, and others engaged in the same objectives. The principal of the fund as of June 30, 1957, including donated assets at its inception and retained earnings for fiscal year 1957, is \$13,094,994. This amount, together with earnings for 1958 totaling \$653,111, plus an estimated amount of assets to be donated during fiscal year 1958 of \$1,267,396, represents an estimated \$15,015,501 investment of the Government at the end of fiscal year 1958.

Statements reflecting the estimated assets and liabilities and income and expenses of the working capital fund for fiscal years 1957, 1958, and 1959 are printed in the Budget schedules and in the Subcommittee Print.

(p) Cooperative Work, Forest Service (Trust Fund)

Contributions are received from cooperators, viz., counties, States, timber sale operators, individuals, and associations, and are expended by the Forest Service in accordance with the terms of the applicable cooperative agreements. The work consists of protection and improvement of the national forests, and forest investigations and protection, reforestation, and administration of private forest lands.

The major programs conducted under the account "Cooperative Work, Forest Service" are described below in terms of the projects reflected in the statement at the end of this section.

1. Construction and Maintenance of Roads and Trails, and
2. Construction and Maintenance of Other Improvements:

The Act of June 30, 1914 (16 U.S.C. 498) authorizes the acceptance of deposits for the improvement of the national forests, and the Act of March 3, 1925, as amended by section 5 (a) of the Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of deposits for administration, improvement, reforestation, and such other kinds of work as the Forest Service is authorized to do, on non-Federally owned lands in or near the national forests. Section 5 (b) of this Act authorizes performance of any such kind of work in connection with the occupancy or use of the national forests or other lands administered by the Forest Service. Deposits are accepted from States, counties, associations, etc., for the construction and maintenance of improvements which are of mutual benefit to both parties or of public benefit. For example, many cooperative agreements are made with counties for the construction and maintenance of roads. In some cases, the Forest Service will pay a county for constructing a short section of a road at a terminus of the county road system. In other cases, a county will deposit money to the Cooperative Work fund to cover the cost of constructing a short stretch of county road which connects with a Forest Service road.

Timber purchasers are required to make repairs or take other corrective measures for damages resulting from their logging operations to national forest lands or to improvements, and for the maintenance occasioned by their heavy hauling on forest roads. In many instances purchasers prefer that such repairs or corrective measures be done by the Forest Service at the operator's expense. Typical cooperative work under this arrangement is the added road maintenance required to keep roads in condition under heavy logging traffic, repair of telephone lines damaged in logging, and measures to check erosion in skid trails.



3. Protection of National Forests and Adjacent Private Lands:

The Act of June 30, 1914 (16 U.S.C. 498) authorizes the acceptance of deposits for the protection of the national forests and the Act of March 3, 1925, as amended by section 5, Act of April 24, 1950 (16 U.S.C. 572), authorizes the acceptance of contributions for the protection of private lands in or near the national forests. The major portion of the obligations is for the protection of private lands from fire. This arrangement is of mutual advantage to both parties inasmuch as there are millions of acres of private forest land intermingled with land in Federal ownership on the national forests. The lands in private ownership are usually broken up into tracts so small that it would be uneconomical for the owner to set up a fire control organization for the protection of his land. The advantage to the Government arises from the fact that in many cases it would be necessary to suppress the fires on the private land without reimbursement in order to protect the adjoining Federal land.

4. Sale Area Betterment (including reforestation) and Scaling:

Sale area betterment

Under section 3 of the Act of June 9, 1930 (16 U.S.C. 576b) funds are collected from timber sale operators to insure establishment, after cutting, of a new crop where natural regeneration is not satisfactory, to control residual stand compositions where undesirable species tend to invade cutover areas, and to take special measures to improve the quality of the future crop of timber. Such expenditures are essential to maintain productivity on many sale areas and to insure marketability of the next stand of timber. These funds are used on the areas cut over by timber purchasers.

The average collection in fiscal year 1957 was 80¢ per thousand board feet cut on the national forests. In the Lake States Region, the amount collected is used largely for reforestation to supplement and improve natural regeneration on the cutover areas. In the South, a major problem is to control inferior hardwoods on the highly productive pine-producing land and most of the amount collected is used for removing worthless trees which otherwise would crowd out seedlings of desirable species on cutover areas.

During fiscal year 1957, obligations for sale area betterment work on all national forests amounted to approximately \$7,461,126. This expenditure enabled the Forest Service to plant and seed 68,626 acres of cutover land; prepare 40,283 acres for natural seeding by scarifying, poisoning rodents, and other seedbed preparation; to release plantations and weed and thin 375,514 acres of cutover land; to prune 134,491 acres of promising saplings and poles remaining on cutover areas; to prevent damage to young growth by hogs, sheep, deer, and other grazing animals, largely by fencing on 105,445 acres; to control tree diseases threatening young growth on 17,030 acres, and to prepare otherwise 47,607 cutover acres for planting.



There is a necessary time lag between the collection of funds prior to cutting and the use of the funds. The causes and extent of this lag for the three general purposes for which the funds are used are as follows:

- (1) Regeneration, including planting, seeding, and special measures to facilitate natural seeding. Normally these activities can be carried on within three years after the area is cut over, the elapsed time depending largely upon the amount of preparatory work the cutover area requires before the regeneration measures can be carried out.
- (2) Measures to assure survival of young growth. This includes (a) the removal of inferior tree species and worthless brush through girdling, cutting, and poisoning, and to a lesser extent (b) animal, rodent, and disease control. The time lag between cutting and performance of this work varies with the nature of the element to be controlled and the size and ability of the young growth to meet such competition. Normally the work can be done within a two or three year period but frequently such control must extend for some 7 to 10 years.
- (3) Measures to improve the future stand of timber. This is largely in the form of pruning residual trees left on the cutover area, which can be done promptly.

#### Scaling

Under provisions of section 210 of the Act of September 21, 1944 (16 U.S.C. 572a) acceptance of deposits from timber purchasers for cooperative scaling service is authorized. Such arrangements are established only when requested by the operator and when it is determined the additional work can be performed without net cost to the Government. Where cooperative scaling is done, the cost of the job is divided equitably between the Government and the operator on the basis of time spent on obtaining the records required by each party. The operator's share is deposited in the cooperative fund. This arrangement is possible in only a limited number of situations.

Through avoiding unnecessary duplication of personnel, it permits more efficient operation by both the purchaser and the Government.

#### 5. Research Investigations:

The Acts of June 30, 1914, and May 22, 1928, authorize the acceptance of deposits for forest investigations. Deposits are received from States, associations, industrial concerns, and others to finance research projects which are of mutual benefit to both parties. For example, when a comprehensive forest survey is inaugurated in a State,

the State authorities may make a deposit to the Cooperative Work fund for more intensive or rapid completion of the survey than would otherwise be possible. In other cases, an industrial concern, State or association, may ask a research unit of the Forest Service to undertake a research project in which they and the Forest Service are interested. They will deposit funds either in a single sum or on a continuing basis to partially or wholly cover the cost of the research. The results of such investigations are furnished to the depositor as well as adding to public knowledge on the particular subject.

6. Administration of Private Lands:

The Act of March 3, 1925, as amended by section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for the management of private lands. These contributions are made by private owners having land intermingled with or adjacent to national forests who wish these lands managed in accordance with good forest management practices. Their holdings are usually too small to warrant the employment of professional foresters to administer such tracts. The advantages to the Government include the avoidance of possible high fire hazard areas resulting from improper cutting practices, the elimination of the necessity of precisely marking the boundaries of the private land, and the addition of an area of private forest land handled under proper forest practices.

7. Reforestation (private lands):

The Act of March 3, 1925, as amended by section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for reforestation of private lands situated within or near a national forest. This work is limited to areas of private land within a planting project on the national forests or to areas in which certain civic and other public-spirited organizations have taken an interest.

8. Statement on Utilization of Funds:

Following is a statement of funds received and obligated and balances available by major activities:





COOPERATIVE WORK, FOREST SERVICE

Trust Fund

Project	Balance Available June 30, 1956	Actual fiscal year 1957			Estimate fiscal year 1958			Estimate fiscal year 1959		
		Funds Received	Obligations	Balance	Funds Received	Obligations	Balance	Funds Received	Obligations	Balance
1. Construction and maintenance of roads and trails	\$775,806	\$950,239	\$993,378	\$732,667	\$950,000	\$950,000	\$732,667	\$950,000	\$950,000	\$732,667
2. Construction and maintenance of other improvements	311,416	387,546	366,562	332,400	400,000	400,000	332,400	400,000	400,000	332,400
3. Protection on national forests and adjacent private land:										
(a) Fire	310,538	1,239,283	1,328,685	221,136	1,200,000	1,200,000	221,136	1,200,000	1,200,000	221,136
(b) Other	679,078	775,692	830,088	624,682	800,000	800,000	624,682	800,000	800,000	624,682
4. Sale area betterment (including reforestation) and scaling	14,839,700	5,913,851	7,796,713	12,956,838	7,720,000	9,720,000	10,956,838	8,720,000	9,720,000	9,956,838
5. Research investigations	220,056	849,942	815,886	254,112	850,000	850,000	254,112	850,000	850,000	254,112
6. Administration of private lands	17,975	61,235	59,855	19,355	60,000	60,000	19,355	60,000	60,000	19,355
7. Reforestation (private lands)	1,671	18,410	11,992	8,089	20,000	20,000	8,089	20,000	20,000	8,089
Total	17,156,240	10,196,198	12,203,159	15,149,279	12,000,000	14,000,000	13,149,279	13,000,000	14,000,000	12,149,279

Note:--Balances carried forward are due primarily to necessity of deferring work for which funds are deposited until the most practicable time. For instance, funds for sale area betterment are received in advance of cutting, but work cannot be started until cutting operations are completed. The time lag sometimes extends for several years, depending on the amount of preparatory work required in the sale area, weather conditions, etc.

Above obligations for 1957 include transfers to Forest Reserve Fund of \$11,338 and refunds to cooperators of \$195,004.



STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

(Includes only those amounts which, by November 30, 1957, were actually received or programmed for 1958 or 1959. Since work for other agencies is performed on a service basis, at the request of those agencies and for their benefit, it is not practicable to estimate in advance the amounts to be received in most cases.)

Item	Obligations, 1957	Estimated Obligations, 1958	Estimated Obligations, 1959
Allotments from:			
Soil Conservation Service:			
<u>Watershed Protection</u> - For plan-			
ning, installing improvement			
measures, and investigations			
in river basins in connection			
with watershed protection			
activities . . . . .	\$665,613:	\$815,494:	\$605,225
<u>Flood Prevention</u> - For measures			
primarily for flood prevention			
(works of improvement) . . . . .	1,516,711:	1,771,732:	1,576,000
<u>Great Plains Conservation</u>			
<u>Program</u> - For research serv-			
ices, advice, and guidance to			
agencies conducting nursery			
production and tree planting			
phases of the Great Plains			
Conservation Program . . . . .	- -:	30,000:	30,000
<u>Agricultural Conservation Program:</u>			
<u>Service</u> - For cooperation in			
administering the naval stores			
program . . . . .	111,221:	123,790:	123,790
<u>Conservation Reserve, Soil Bank</u>			
<u>Programs</u> - For assistance in the:			
conservation reserve program,			
primarily for expansion of			
production of tree seedlings . .	7,632,263:	4,865,000:	2,865,000
<u>Salaries and Expenses, Civil</u>			
<u>Defense Functions of Federal</u>			
<u>Agencies</u> - For civil defense			
activity relating to fire			
control activity in rural			
areas . . . . .	67,179:	- -:	- -
Total Allotments . . . . .	9,992,987:	7,606,016:	5,200,015

(Continued on next page)



Item	Obligations, 1957	Estimated Obligations, 1958	Estimated Obligations, 1959
Allocations (Advanced from other Agencies):			
<u>International Cooperation Administration</u> - For economic and technical assistance programs .....	304,530:	35,869:	35,869
<u>Department of the Army:</u>			
For research in connection with the production of glycerol from wood sugars and for conducting studies on the characterization of nitrating pulps ..	153:	- -:	- -
For relocation and replacement of Forest Service facilities necessitated by development of dams and reservoirs .....	27,240:	22,200:	11,500
Total, Department of the Army ..	27,393:	22,200:	11,500
<u>Department of the Navy:</u>			
For investigations, tests, and studies in connection with various wood problems .....	154:	- -:	- -
Total Allocations .....	332,077:	103,069:	97,369
Trust Funds:			
<u>Cooperative Work, Forest Service:</u>			
Trust funds deposited by co-operators for the accomplishment of certain projects which are of mutual benefit to the Forest Service and such co-operators as follows:			
1. Construction and maintenance of roads and trails ...	993,378:	950,000:	950,000
2. Construction and maintenance of other improvements ..	366,562:	400,000:	400,000
3. Protection of national forests and adjacent private land .....	2,158,773:	2,000,000:	2,000,000
4. Sale-area betterment and scaling .....	7,796,713:	9,720,000:	9,720,000
5. Research investigations ...	815,886:	850,000:	850,000
6. Administration .....	59,855:	60,000:	60,000
7. Reforestation .....	11,992:	20,000:	20,000
Total, Cooperative Work .....	12,203,159:	14,000,000:	14,000,000

(Continued on next page)

Item	: Obligations, 1957	: Estimated Obligations, 1958	: Estimated Obligations, 1959
Trust Funds--Continued:	:	:	:
Miscellaneous Contributed Funds	:	:	:
(principally cooperative work	:	:	:
on blister rust control) .....	18,950:	19,712:	-
Technical Services and Other	:	:	:
Assistance, Agricultural Con-	:	:	:
servation Program - For tech-	:	:	:
nical assistance in formulating:	:	:	:
and carrying out the forestry	:	:	:
portion of the agricultural	:	:	:
conservation cost-sharing pro-	:	:	:
grams in participating	:	:	:
counties .....	1,894:	10,000:	10,000
Total Trust Funds .....	12,224,003:	14,029,712:	14,010,000
Obligations under Reimbursements	:	:	:
from Governmental and Other	:	:	:
Sources:	:	:	:
Forest protection and	:	:	:
utilization <u>a/</u> .....	6,603,272:	5,064,371:	5,064,371
Forest roads and trails, and	:	:	:
Roads and trails for States <u>b/</u> :	968,002:	1,500,000:	1,500,000
All other ..	144,477:	130,910:	130,910
Total Reimbursements .....	7,715,751:	6,695,281:	6,695,281
TOTAL, OBLIGATIONS UNDER	:	:	:
ALLOTMENTS AND OTHER FUNDS .....	30,264,818:	28,439,078:	26,002,665

a/ Primarily from other Government agencies, States, and counties, for forest fire protection and suppression, insect and disease control, forest research, investigations at Forest Products Laboratory, surveys, land appraisals, mapping, cruising timber, preparation of timber management plans, snow scale readings, and other miscellaneous services.

b/ Primarily road construction for U. S. Army.





## PASSENGER MOTOR VEHICLES AND AIRCRAFT

### Replacement of passenger motor vehicles.

The 1959 estimates for the Forest Service propose the replacement of 120 passenger motor vehicles which meet replacement standards. It is estimated that early in fiscal year 1959 the passenger vehicle fleet will include 169 units meeting or exceeding the replacement standards. Of this total 76 will meet both age and mileage standards, 65 age only, and 28 mileage only. Only 120 of these vehicles will be replaced. The increase in the number of vehicles meeting both age and mileage standards, and mileage only, as compared to age only minimum standards, is the result of greater utilization of vehicles. After the 120 replacements have been made, indications are that the fleet will include 20 units meeting the age mileage standards, 14 mileage only, and 15 age only.

It is the Forest Service practice to inspect all units which meet or exceed replacement standards and continue in use those units which the appraisal shows can be dependably and economically used another year. The dependability of equipment is an important factor in keeping work programs on schedule and in meeting emergencies. For example, breakdowns of vehicles while on field trips cause disruptions and delays in field work and loss of effective work time of employees. The continued use of old vehicles is also undesirable from a safety standpoint since most of them are operated over rough, narrow, winding roads in mountainous country. Because most of the vehicle use is under adverse conditions, operating and repair costs of vehicles ordinarily become excessive after they reach replacement standards. Overall costs are reduced if over-age and high-mileage units are replaced as soon as inspections reveal that continued operation is uneconomical and unsafe.

Based on the planned schedule of replacements, the Forest Service will have a total of 689 passenger motor vehicles in fiscal year 1959. The requested authorization is essential for effective and economical operation of Forest Service programs.

As of June 30, 1957, the age and mileage classes of Forest Service vehicles were:

<u>Age Data</u>		<u>Mileage Data</u>	
<u>Year Model</u>	<u>No. of Vehicles</u>	<u>Lifetime Mileage</u>	<u>No. of Vehicles</u>
1952 or older	119	Over 100,000	5
1953	77	80,000 to 100,000	27
1954	75	60,000 to 80,000	78
1955	142	40,000 to 60,000	119
1956	156	20,000 to 40,000	216
1957	<u>117</u>	0 to 20,000	<u>241</u>
Total	<u>686</u>	Total	<u>686</u>

Passenger motor vehicles are used by (1) forest officers in the protection, utilization, management, and development of the national forests and land utilization projects and in the program for control of forest pests; (2) research technicians on experimental forests and ranges, on field research projects and forest surveys; (3) foresters engaged in carrying out the laws providing for State and private forestry cooperation; and (4) regional office field-going administrative officers in performing, directing, and inspecting field work.

The Forest Service is essentially a field organization and its passenger motor vehicles are located mainly at regional, national forest, and ranger district headquarters, land utilization projects, and experimental forests and ranges. There are over 232 million acres within the exterior boundaries of the national forests and land utilization projects and about 435 million acres of State and private forest land are included within the areas which benefit from Federal participation in the cooperative forest program. Much of this area is without common carrier service, and most forest areas and research centers are remote from commercial travel routes, requiring extensive use of motor vehicles as a means of transportation. The major portion of transportation needs, particularly at forest regional and supervisor levels and at other larger headquarters, involves multiple passenger use and can be more expeditiously and economically met by use of sedans and station wagons than by other types of vehicles.

#### Replacement and additions of aircraft.

The 1959 estimates for the Forest Service propose replacement of four and addition of two aircraft.

The Forest Service currently has a total of 31 aircraft comprising the following:

- 10 light reconnaissance airplanes
- 10 medium and heavy cargo and transport  
airplanes (8 medium; 2 heavy)
- 3 forest spray airplanes (Stearman, Piper and TBM)
- 1 helicopter
- 7 torpedo bomber airplanes

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The reconnaissance and transport airplanes are used for transportation of administrative personnel, firefighters, including "smoke jumpers," equipment and supplies to remote inaccessible areas where airplane service of commercial operators is inadequate or unavailable, for fire reconnaissance and detection, for location of incipient outbreaks of forest insect pests, and in appraising the scope and seriousness of infestations in forested areas. The forest spray airplanes are used for research and development work in forest insect control needs. The helicopter is used in experimental tactical forest fire suppression work in southern California.

Seven Grumman Avenger single engine torpedo bombers (Navy TBM) are for use in direct tactical forest fire fighting.

It is estimated that it will be necessary to replace two reconnaissance airplanes and two multipurpose cargo, smokejumper, personnel transport planes that are more than eleven years old. These airplanes are rapidly becoming unairworthy and have reached the point where it is uneconomical to overhaul or modernize them to meet the airworthiness requirements of Civil Air Regulations. Since Forest Service airplanes are operated to a large extent over rough mountainous terrain where landing fields are poor and scarce, these planes must be maintained to provide top performance and dependability.

The proposed replacement planes are needed to guide complicated aerial attack on forest fires by privately-owned airtankers and helicopters, to facilitate detection patrol and reconnaissance, and to transport smokejumpers, fire fighters, equipment and supplies in remote areas where airplane services of commercial operators are inadequate or unavailable. In addition, they are needed for locating incipient outbreaks of forest pests, appraising the scope and seriousness of infestation in forested areas, and directing and evaluating effectiveness of pest control operations.

In addition to the replacements, one new small (4-place) aircraft is needed for the California Region. That Region has pioneered in the use of airplane delivery of water and chemicals by cascading on forest fires. These aircraft are called "air tankers" and most of those used are privately owned. Most efficient and safest use of air tankers requires leadership and supervision of a pilot and fire specialist in a small Forest Service-owned aircraft. The increased use of air tankers makes it necessary to add this small aircraft.

A second small (4-place) airplane is needed for the Intermountain Region in Idaho and Utah. This plane will be used for a variety of jobs, most important of which are reconnaissance of fires and detection flights. Other uses include reconnaissance in rough mountain flying for insect control projects and scouting of large fires. Acceptable private planes with qualified pilots are often unavailable in the areas involved.

Based on the above schedule of replacements and additions, the Forest Service will have a total of 33 airplanes in fiscal year 1959. The requested authorization is essential for effective and economical operation of Forest Service programs.







